

PART A  
IONOSPHERIC DATA

ISSUED  
JULY 1957

U. S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS  
CENTRAL RADIO PROPAGATION LABORATORY  
BOULDER, COLORADO



## IONOSPHERIC DATA

### CONTENTS

	<u>Page</u>
Symbols, Terminology, Conventions. . . . .	2
Predicted and Observed Sunspot Numbers . . . . .	5
World-Wide Sources of Ionospheric Data . . . . .	6
Hourly Ionospheric Data at Washington, D. C. . . .	8, 19, 31, 43
Erratum. . . . .	8
Examples of Ionospheric Vertical Soundings Thule, Greenland; April 28, 1957 . . . . .	9
Radio Noise Data . . . . .	11
Tables of Ionospheric Data . . . . .	19
Graphs of Ionospheric Data . . . . .	43
Index of Tables and Graphs of Ionospheric Data in CRPL-F155 (Part A) . . . . .	79

## SYMBOLS, TERMINOLOGY, CONVENTIONS

Beginning with data reported for January 1952, and continuing through December 1956, the symbols, terminology, and conventions for the determination of median values used in this report (CRPL-F series) conform as far as practicable to those adopted at the Sixth Meeting of the International Radio Consultative Committee (C.C.I.R.) in Geneva, 1951. Excerpts concerning symbols and terminology from Document No. 626-E of this Meeting are given on pages 2-7 of the report CRPL-F89, "Ionospheric Data," issued January 1952. Reprints of these pages are available upon request.

Beginning with data for January 1957, the symbols used are given in NBS Report 5033, "Summary of Changes in Ionospheric Vertical Soundings, Observing and Scaling Procedures - Effective 1 January 1957," which draws upon the First Report of the Special Committee on World-Wide Ionospheric Soundings (URSI/AGI), Brussels, Sept. 2, 1956. A list of these symbols is available upon request.

In the Second Report of the Special Committee on World-Wide Ionospheric Soundings of the URSI/AGI Committee, May 1957, a new descriptive letter was introduced:

- M    Measurement questionable because the ordinary and extraordinary components are not distinguishable.

There was an expansion in meaning of the following:

- Z    (1) (qualifying letter) Measurement deduced from the third magnetoionic component.  
       (2) (descriptive letter) Third magnetoionic component present.

Beginning with data for January 1945, median values are published wherever possible. Where averages are reported, they are, at any hour, the average for all the days during the month for which numerical data exist.

The following conventions are used in determining the medians for hours when no measured values are given because of equipment limitations and ionospheric irregularities. Symbols used are those given above.

- a. For all ionospheric characteristics:

Values missing because of A, C, F, H, L, N, R or S are omitted from the median count.



b. For critical frequencies and virtual heights:

Values of  $f_oF_2$  (and  $f_oE$  near sunrise and sunset) missing because of E are counted as equal to or less than the lower limit of the recorder. Values of  $h'F$  (and  $h'E$  near sunrise and sunset) missing for this reason are counted usually as equal to or greater than the median. Other characteristics missing because of E are omitted from the median count.

Values missing because of G are counted:

1. For  $f_oF_2$ , as equal to or less than  $f_oF_1$ .
2. For  $h'F_2$ , as equal to or greater than the median.

The symbol W is included in the median count only when it replaces a height characteristic; the descriptive symbol D, only when it replaces a frequency characteristic.

Values missing for any other reason are omitted from the median count.

c. For MUF factor (M-factors):

Values missing because of G or W are counted as equal to or less than the median.

Values missing for any other reason are omitted from the median count.

d. For sporadic E (Es):

Values of  $fEs$  missing because of E or G (and B when applied to the daytime E region only) are counted as equal to or less than the median  $f_oE$ , or equal to or less than the lower frequency limit of the recorder.

At night B for  $fEs$  is counted on the low side when there is a numerical value of  $f_oF_2$ ; otherwise it is omitted from the median count.

Values of  $fEs$  missing for any other reason, and values of  $h'Es$  missing for any reason at all are omitted from the median count.

Beginning with data for November 1945, doubtful monthly median values for ionospheric observations at Washington, D. C., are indicated by parentheses, in accordance with the practice already in use for doubtful hourly values. The following are the conventions used to determine whether or not a median value is doubtful:

1. If the count is four or less, the data are considered insufficient and no median value is computed.

2. For the F2 layer, h'F or foEs, if the count is from five to nine, the median is considered doubtful. The E and F1 layers are so regular in their characteristics that, as long as the count is at least five, the median is not considered doubtful. A count of at least 5 is considered sufficient for an h'Es median.

3. For all layers, if more than half of the data used to compute the medians are doubtful (either doubtful or interpolated), the median is considered doubtful.

The same conventions are used by the CRPL in computing the medians from tabulations of daily and hourly data for stations other than Washington, beginning with the tables in IRPL-F18.

Ordinarily, a blank space in the fEs or foEs column of a table is the result of the fact that a majority of the readings for the month are below the lower limit of the recorder or less than the corresponding values of foE. Blank spaces at the beginning and end of columns of h'F2 or h'F1, foF1, h'E, and foE are usually the result of diurnal variation in these characteristics. Complete absence of medians of h'F1 and foF1 is usually the result of seasonal effects.

The dashed-line prediction curves of the graphs of ionospheric data are obtained from the predicted zero-muf contour charts of the CRPL-D series publications. The following points are worthy of note:

- a. Predictions for individual stations used to construct the charts may be more accurate than the values read from the charts since some smoothing of the contours is necessary to allow for the longitude effect within a zone. Thus, inasmuch as the predicted contours are for the center of each zone, part of the discrepancy between the predicted and observed values as given in the F series may be caused by the fact that the station is not centrally located within the zone.
- b. The final presentation of the predictions is dependent upon the latest available ionospheric and radio propagation data, as well as upon predicted sunspot number.
- c. There is no indication on the graphs of the relative reliability of the data; it is necessary to consult the tables for such information.
- d. The tables may contain median values of either foEs or fEs. The graph of median Es corresponds to the table. Percentage curves of fEs are estimated from values of foEs when necessary.



## WORLD - WIDE SOURCES OF IONOSPHERIC DATA

The ionospheric data given here in tables 1 to 72 and figures 1 to 144 were assembled by the Central Radio Propagation Laboratory for analysis and correlation, incidental to CRPL prediction of radio propagation conditions. The data are median values unless otherwise indicated. The following are the sources of the data in this issue:

Australian Department of Supply and Shipping, Bureau of Mineral Resources, Geology and Geophysics:  
Watheroo, Western Australia

University of Graz:  
Graz, Austria

Defence Research Board, Canada:  
Baker Lake, Canada  
Churchill, Canada  
Ottawa, Canada  
Resolute Bay, Canada  
Winnipeg, Canada

Radio Wave Research Laboratories, National Taiwan University,  
Taipeh, Formosa, China:  
Formosa, China

General Direction of Posts and Telegraphs, Helsinki, Finland:  
Nurmijarvi, Finland

National Laboratory of Radio-Electricity (French Ionospheric Bureau):  
Casablanca, Morocco  
Poitiers, France

Institute for Ionospheric Research, Lindau Uber Northeim,  
Hannover, Germany:  
Lindau/Harz, Germany

The Royal Netherlands Meteorological Institute:  
De Bilt, Holland

Icelandic Post and Telegraph Administration:  
Reykjavik, Iceland

Indian Council of Scientific and Industrial Research, Radio Research Committee, New Delhi, India:  
Ahmedabad (Physical Research Laboratory)  
Bombay (All India Radio)  
Delhi (All India Radio)  
Kodaikanal (India Meteorological Department)  
Madras (All India Radio)  
Tiruchy (All India Radio)

Ministry of Postal Services, Radio Research Laboratories,  
Tokyo, Japan:

Akita, Japan  
Tokyo (Kokubunji), Japan  
Wakkanai, Japan  
Yamagawa, Japan

Norwegian Defence Research Establishment, Kjeller per  
Lillestrom, Norway:

Oslo, Norway  
Tromso, Norway

Manila Observatory:  
Baguio, P. I.

Institute of Terrestrial Magnetism, Ionosphere and Radio Propa-  
gation, Moscow, U.S.S.R.:

Alma-Ata  
Ashkhabad  
Irkutsk  
Leningrad  
Moscow  
Rostov-on-Don  
Sverdlovsk  
Tomsk

South African Council for Scientific and Industrial Research:

Capetown, Union of South Africa  
Johannesburg, Union of South Africa  
Nairobi, Kenya (East African Meteorological Department)

Research Institute of National Defence, Stockholm, Sweden:

Kiruna, Sweden  
Upsala, Sweden

Royal Board of Swedish Telegraphs, Radio Department, Stockholm,  
Sweden:

Lulea, Sweden

Post, Telephone and Telegraph Administration, Berne, Switzer-  
land:

Schwarzenburg, Switzerland

United States Army Signal Corps:

Adak, Alaska  
Ft. Monmouth, New Jersey  
Okinawa I.  
Thule, Greenland



National Bureau of Standards (Central Radio Propagation Laboratory):

Anchorage, Alaska  
 Fairbanks, Alaska (Geophysical Institute of the University of Alaska)  
 Huancayo, Peru (Instituto Geofisico de Huancayo)  
 Maui, Hawaii  
 Narsarssuak, Greenland  
 Panama Canal Zone  
 Point Barrow, Alaska  
 San Francisco, California (Stanford University)  
 Talara, Peru (Instituto Geofisico de Huancayo)  
 Washington, D. C.

## HOURLY IONOSPHERIC DATA AT WASHINGTON, D. C.

The data given in tables 73 through 84 follow the scaling practices given in the report IRPL-C61, "Report of International Radio Propagation Conference," pages 36 to 39, and the median values are determined by the conventions given above under "Symbols, Terminology, Conventions." Beginning with September 1949, the data are taken at Ft. Belvoir, Virginia.

The interpretation of a cell is as follows: U F  
 32

The U is a qualifying symbol meaning doubtful. Other qualifying symbols are I, interpolated, D, greater than, E, less than, J, ordinary component deduced from extraordinary, and T, value determined by a sequence of observations. Absence of a letter in the upper left position means full weight is given to the observation.

Symbols such as F above are given in the upper right position.

There should be no difficulty in the placing of the decimal point. For the time being, a final zero will be found in each value of foF1. Thus at a later date it will be possible to register more closely scaled values of this characteristic, whenever such are reported.

## ERRATUM

1. CRPL-F154 (Part A), p. 26, table 48: Change sweep to read "16.0 Mc to 1.6 Mc in 12 minutes 30 seconds."

EXAMPLES OF IONOSPHERIC VERTICAL SOUNDINGS  
 THULE, GREENLAND; APRIL 28, 1957  
 (Geomagnetic Latitude  $88^{\circ}\text{N}$ )

The following ionograms were obtained at the Signal Corps Thule, Greenland vertical sounding station. They are typical of day and night conditions for April at this geomagnetic latitude. Ionospheric data are scaled directly from these records onto the daily f-plot, a graph of frequency characteristics vs. time. The f-plot for the day represented by these soundings is found on the following page. Medians as found in the Tables of Ionospheric Data are calculated using hourly values taken from the f-plot or directly from the ionogram.



Fig. A. Thule, Greenland, April 28, 1957, 2300 hours,  $75^{\circ}\text{W}$  time.

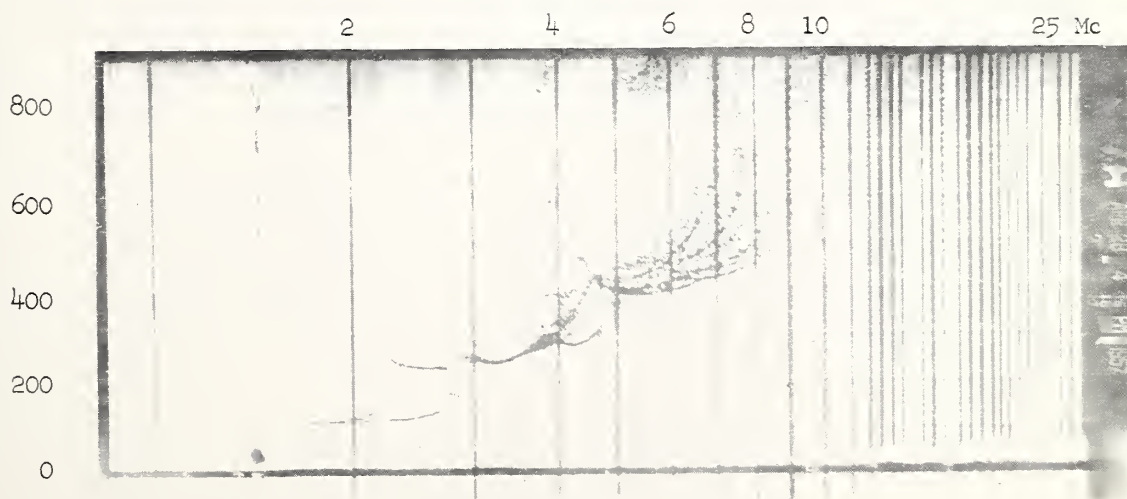


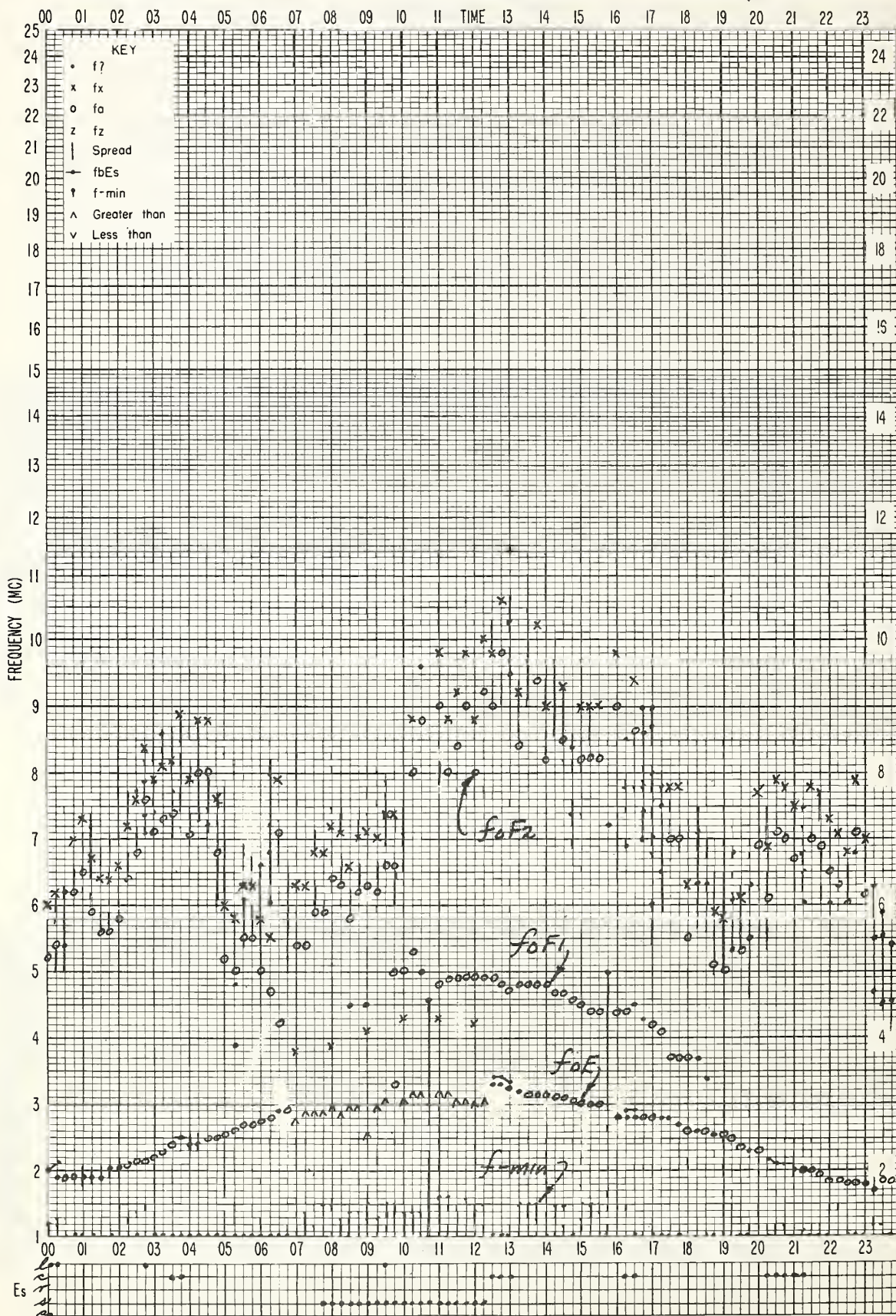
Fig. B. Thule, Greenland, April 28, 1957, 1615 hours,  $75^{\circ}\text{W}$  time.



THULE, GREENLAND

STATION 10NTH

f - PLOT OF IONOSPHERIC DATA

DATE 28 April 1957SCALED BY CWN - CLD



## Radio Noise Data

The results of radio noise measurements are presented in the following graphs and tables. These are based on three parameters of the noise: (1) the mean power, (2) the mean envelope voltage, and (3) the mean logarithm of the envelope voltage. The mean power averaged over a period of several minutes is the basic parameter and is expressed as an effective antenna noise figure,  $F_a$ .  $F_a$  is defined as the noise power available from an equivalent lossless antenna in db above ktb (the thermal noise power available from a passive resistance) where

$k$  = Boltzman's constant ( $1.38 \times 10^{-23}$  joules per degree Kelvin)

$t$  = Absolute room temperature (taken as  $288^\circ$  K)

$b$  = Bandwidth in cycles per second.

The mean voltage and mean logarithm are expressed as deviations,  $V_d$  and  $L_d$  respectively, in db below the mean power.

Measurements of these parameters were made with the National Bureau of Standards Radio Noise Recorder, Model ARN-2, which has an effective noise bandwidth of 280 cycles per second and uses a standard 21.75' vertical antenna. A 15-minute recording is made on each frequency each hour, and these 15-minute samples are taken as representing the noise conditions for the full hour. The month-hour medians,  $F_{am}$ ,  $V_{dm}$ , and  $L_{dm}$  are determined from these hourly values for each of the corresponding parameters and the resulting medians are plotted at the half-hour point on the curves. Normally from 25 to 30 observations of the mean power are obtained monthly for each hour of the day, and from 10 to 15 observations of the voltage and logarithm deviations. When there are fewer than 15 observations of the mean power, or 7 observations of the voltage and logarithm deviations, the tabulated values are identified by an asterisk (\*).

The upper and lower decile values of  $F_a$  are also reported in the following tabulation to give an indication of the extent of the variation of the noise power from day to day at a given time of day. These are expressed in db above and below the month-hour median,  $F_{am}$ , and designated by  $D_u$  and  $D_l$  respectively.

Information on expected worldwide noise levels and their application to systems problems is presented in NBS Circular 557 (available from the Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C.). More recent estimates of radio noise levels are given in CCIR Report No. 65, "Report on Revision of Atmospheric Radio Noise Data", Warsaw, 1956 (available from the International Telecommunication Union, Geneva).

Comparisons are made in this issue between observed time-block median values of noise for the past season and predicted values taken from CCIR Report No. 65. A "time-block median" is the median of all values obtained during a four-hour period of the day for an entire season.

## RADIO NOISE DATA

Station Boulder, Colorado Lat. 40°N Lang. 105°W Type Recorder ARN-2 Month May 19 57

Local Mean Time																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	51kc																							
F <sub>om</sub>	137	137	135	137	129	129	127	125	*124	125	127	131	135	139	141	143	140	139	140	137	141	139	139	139
D <sub>u</sub>	8	6	8	6	10	4	6	8		10	7	11	12	10	8	6	11	10	7	10	4	8	8	6
D <sub>ℓ</sub>	6	8	6	10	6	10	10	12		8	8	8	5	6	8	8	5	6	7	4	8	4	4	6
V <sub>dm</sub>	7.0	7.0	7.0	7.5	10.0	11.0	10.0	10.5	*11.0	11.0	8.5	10.0	9.0	10.0	8.0	8.5	7.5	7.0	8.0	7.5	6.5	7.0	8.0	7.0
L <sub>dm</sub>	14.5	15.0	14.0	15.0	13.0	19.5	19.0	19.5	*19.0	19.0	15.5	16.5	16.0	16.0	15.0	15.5	15.0	15.0	13.0	14.0	12.5	13.0	15.0	12.5
	113kc																							
F <sub>om</sub>	122	124	122	122	111	108	108	108	*104	102	106	116	120	123	124	124	128	124	123	124	124	126	124	126
D <sub>u</sub>	8	6	6	8	13	12	10	14		18	17	11	13	17	14	16	14	12	11	8	8	6	8	4
D <sub>ℓ</sub>	6	10	10	12	11	20	22	21		14	13	14	9	10	6	6	8	8	9	8	6	6	6	8
V <sub>dm</sub>	7.0	6.5	7.0	8.0	11.5	10.0	11.0	11.0	*11.0	10.0	10.0	12.0	11.5	11.0	10.0	9.0	8.5	8.5	8.5	7.0	6.5	7.0	8.0	6.0
L <sub>dm</sub>	13.5	14.0	13.5	14.0	18.0	15.5	15.5	18.0	*19.0	16.0	17.5	17.5	23.0	20.0	18.5	17.5	16.5	16.0	17.0	13.0	13.5	12.5	14.0	12.0
	246kc																							
F <sub>om</sub>	111	109	105	105	89	85	89	91	*95	83	85	99	105	110	111	112	114	109	109	109	113	113	113	111
D <sub>u</sub>	6	6	10	10	18	18	18	19		22	21	20	19	16	16	17	15	14	12	12	6	4	4	4
D <sub>ℓ</sub>	12	8	8	10	10	12	16	17		10	10	20	17	14	12	11	13	12	10	6	10	10	12	10
V <sub>dm</sub>	7.0	6.0	6.5	8.0	7.0	5.0	7.0	6.0	*5.0	5.5	5.0	8.5	11.5	11.0	11.0	10.5	11.0	8.0	9.0	7.0	6.0	7.0	6.0	4.0
L <sub>dm</sub>	12.0	11.0	11.0	15.0	12.5	11.0	11.0	15.0	*8.0	8.0	8.0	13.0	19.5	21.0	21.5	19.0	20.5	15.5	15.0	13.0	11.0	12.0	11.0	11.5
	545kc																							
F <sub>om</sub>	92	92	90	82	64	74	76	79	*82	71	76	80	94	94	96	96	95	90	78	92	92	94	94	94
D <sub>u</sub>	6	6	8	12	18	10	12	19		10	17	26	14	21	20	18	17	18	28	8	8	4	6	4
D <sub>ℓ</sub>	10	10	10	6	4	10	10	10		5	11	12	22	22	18	18	17	16	2	10	6	8	6	8
V <sub>dm</sub>	6.0	5.0	6.0	7.5	8.0	*4.0	6.0	*6.5		*5.5	*4.5	6.5	11.5	10.0	11.5	10.0	10.5	7.0	10.5	6.5	5.0	4.0	6.0	5.0
L <sub>dm</sub>	12.0	10.0	11.0	14.0	10.0	*5.0	9.5	*12.0		*7.0	*7.0	9.0	20.0	20.5	23.5	19.0	18.0	12.5	18.0	12.0	8.5	8.0	8.5	9.5
	2.5Mc																							
F <sub>om</sub>	70	69	68	67	60	50	46	46	*45	46	47	49	50	52	54	58	61	54	58	68	72	72	71	70
D <sub>u</sub>	6	5	8	7	12	8	4	4		2	6	22	24	26	24	23	21	20	14	4	6	6	5	6
D <sub>ℓ</sub>	8	7	8	9	6	6	4	6		4	3	5	4	4	6	10	15	8	8	6	6	8	7	8
V <sub>dm</sub>	4.5	4.0	5.0	4.5	4.0	2.5	2.5	2.0	*2.0	*3.0	2.0	2.5	2.5	2.5	5.5	6.5	6.0	5.0	3.5	2.5	3.5	3.0	4.0	4.0
L <sub>dm</sub>	6.0	7.0	7.0	6.0	7.0	5.0	4.0	4.0	*4.0	*4.0	3.5	4.5	5.0	5.0	6.5	9.0	10.5	7.0	7.0	5.0	7.0	7.0	6.0	6.0
	5Mc																							
F <sub>om</sub>	62	61	61	61	57	49	45	44	*44	43	45	46	47	47	49	51	51	55	59	65	64	63	64	64
D <sub>u</sub>	9	8	8	6	8	6	4	3		4	5	14	22	17	22	24	18	8	6	4	5	6	5	3
D <sub>ℓ</sub>	3	4	4	4	4	6	6	7		6	8	9	8	8	10	10	8	6	6	4	3	2	7	7
V <sub>dm</sub>	4.5	4.0	4.0	4.5	4.0	4.0	2.5	2.0	*2.5	2.0	2.0	2.0	2.0	2.5	4.5	5.0	4.0	3.5	4.0	4.0	4.5	4.0	4.0	3.5
L <sub>dm</sub>	8.0	8.0	8.0	8.0	8.0	7.0	5.5	5.0	*4.0	4.5	4.0	4.0	5.0	6.0	7.0	9.5	7.5	8.0	7.0	8.0	8.0	8.0	8.0	8.0
	10Mc																							
F <sub>om</sub>	45	45	45	43	41	39	37	33	*31	29	31	33	37	42	43	45	47	51	51	51	49	47	46	45
D <sub>u</sub>	6	4	4	6	6	6	6	8		8	17	22	16	19	14	14	10	4	2	2	6	6	5	8
D <sub>ℓ</sub>	2	2	4	4	2	4	4	3		2	4	4	5	8	6	4	4	6	2	4	2	2	3	2
V <sub>dm</sub>	4.5	4.5	5.0	4.0	5.0	5.0	5.0	4.5	*4.0	*3.5	*3.5	4.5	4.0	4.0	4.0	5.0	4.0	4.0	4.0	4.5	4.0	5.0	4.0	4.0
L <sub>dm</sub>	8.0	7.5	8.0	7.0	8.0	7.5	7.5	6.0	*7.0	*5.0	*5.0	7.0	7.5	7.5	9.0	8.0	7.5	7.0	7.0	8.0	7.5	8.0	7.5	7.0
	20Mc																							
F <sub>om</sub>	24	24	24	24	24	24	24	26	*24	24	25	26	28	30	32	31	32	30	29	26	26	24	24	24
D <sub>u</sub>	4	0	2	2	4	6	6	3		4	8	18	18	16	9	16	21	25	31	17	8	4	2	2
D <sub>ℓ</sub>	0	2	2	2	2	2	2	4		0	3	2	4	5	6	5	6	4	3	2	2	0	0	0
V <sub>dm</sub>	2.0	1.5	2.0	2.0	2.0	2.5	2.5	*2.0	*2.0	2.5	3.0	3.0	3.0	4.0	3.5	4.0	3.0	3.5	2.5	2.5	2.5	2.0	2.0	2.0
L <sub>dm</sub>	4.0	3.0	4.0	3.0	3.0	4.5	4.0	*4.0	*3.5	4.0	4.0	4.0	4.5	5.0	9.0	10.5	10.0	10.0	5.5	5.0	5.0	4.5	4.0	4.0

## SEASONAL VALUES OF RADIO NOISE

LAT. 43N LONG. 105W STATION BILL, WYOMINGSEASON Spring ( April ) 19 57

FREQUENCY (Mc)	TIME BLOCKS (LMT)																	
	0000-0400			0400-0800			0800-1200			1200-1600			1600-2000			2000-2400		
	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>
.061	136	4	6	131	5	12	128	6	9	132	10	10	134	10	16	137	8	8
.115	119	5	7	108	12	16	104	10	16	114	16	17	117	12	17	120	9	10
.246	104	6	9	86	13	10	84	13	12	98	19	22	100	15	20	104	11	11
.545	88	7	7	65	12	5	66	12	5	70	32	7	76	20	10	86	12	5
2.5	68	6	8	44	10	10	20	8	3	24	29	5	48	20	12	68	8	12
5.0	64	4	6	44	8	5	18	8	2	28	23	11	56	9	13	64	6	10
10.0	49	5	4	42	4	5	29	8	6	36	8	11	50	4	10	52	4	8
20.0	25	3	2	26	4	2	26	4	3	28	9	4	30	3	4	25	4	2

LAT. 40 N LONG. 105W STATION BOULDER, COLORADOSEASON Spring ( Mar. - May ) 19 57

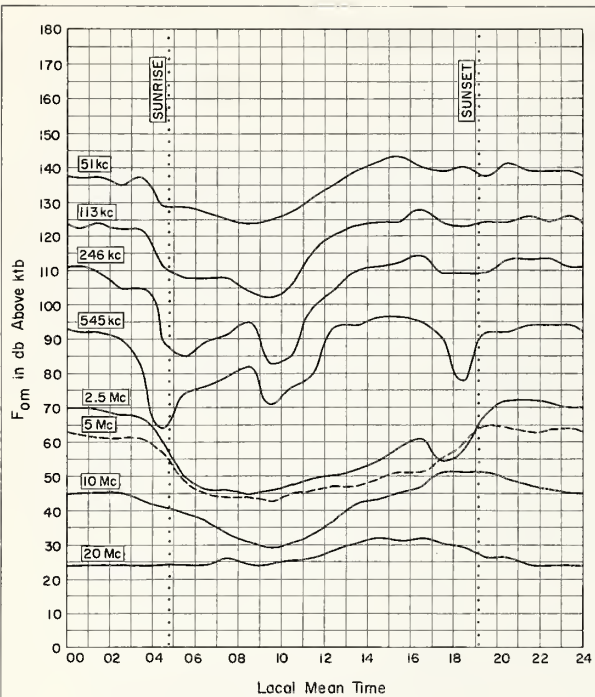
FREQUENCY (Mc)	TIME BLOCKS (LMT)																	
	0000-0400			0400-0800			0800-1200			1200-1600			1600-2000			2000-2400		
	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>	F <sub>om</sub>	D <sub>u</sub>	D <sub>l</sub>
.061	134	6	9	126	8	10	123	10	12	129	9	9	130	10	10	133	9	6
.115	119	6	10	108	10	18	100	16	13	108	16	12	114	11	14	118	9	8
.246	104	9	9	90	16	15	85	18	10	95	14	13	98	14	12	106	8	11
.545	90	7	9	76	12	10	76	11	8	81	14	12	82	14	10	91	8	8
2.5	67	6	8	52	7	6	45	8	4	48	12	4	55	10	9	67	8	7
5.0	60	5	4	49	7	6	39	5	6	41	10	6	54	7	8	61	5	5
10.0	46	4	4	39	6	4	30	10	3	35	11	6	46	5	5	47	4	4
20.0	23	2	1	24	5	2	25	7	3	28	9	5	30	12	5	22	6	2

F<sub>om</sub> = Time block median value of effective antenna noise figure in db above ktbD<sub>u</sub> = Ratio of upper decile to median in dbD<sub>l</sub> = Ratio of median to lower decile in dbLAT. 40N LONG. 105W STATION BOULDER, COLORADOSEASON Spring ( Mar. - May ) 19 57

FREQUENCY (Mc)	TIME BLOCKS (LMT)																	
	0000-0400			0400-0800			0800-1200			1200-1600			1600-2000			2000-2400		
	V <sub>dm</sub>	L <sub>dm</sub>		V <sub>dm</sub>	L <sub>dm</sub>		V <sub>dm</sub>	L <sub>dm</sub>		V <sub>dm</sub>	L <sub>dm</sub>		V <sub>dm</sub>	L <sub>dm</sub>		V <sub>dm</sub>	L <sub>dm</sub>	
.061	6.5	14.0		9.0	16.0		9.0	15.0		8.5	15.0		7.5	14.0		7.5	13.0	
.115	7.0	14.5		9.0	15.5		8.0	16.0		9.5	18.0		7.5	15.0		7.0	14.0	
.246	6.0	11.0		5.5	9.5		5.5	8.0		10.0	16.5		7.0	13.0		6.0	11.5	
.545	6.0	10.0		5.0	9.0		4.0	6.5		7.5	15.0		6.5	12.0		5.0	9.0	
2.5	4.5	8.0		3.5	5.0		2.0	3.0		2.5	6.0		4.0	6.5		4.0	7.5	
5.0	4.0	8.0		4.0	8.0		2.0	3.5		2.0	5.0		3.5	7.0		4.0	8.0	
10.0	4.5	7.5		5.0	7.5		4.0	6.0		4.0	7.0		4.0	6.5		4.0	7.0	
20.0	1.5	3.0		2.0	3.0		2.5	4.0		3.0	5.0		3.0	5.0		2.0	3.5	

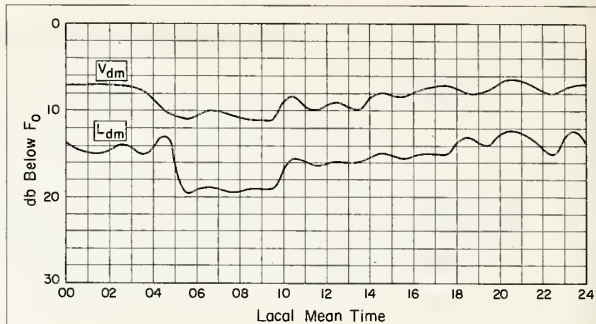
V<sub>dm</sub> = Time block median value of deviation of mean envelope voltage below mean power in dbL<sub>dm</sub> = Time block median value of deviation of mean logarithm of voltage below mean power in db



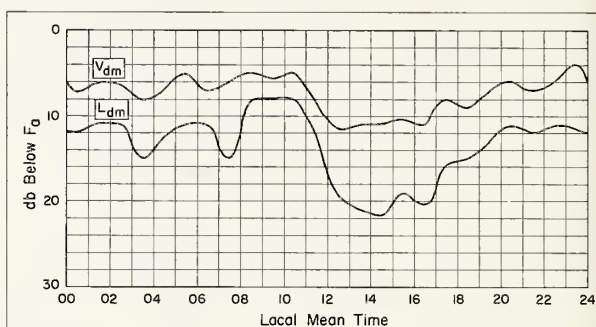


BOULDER, COLORADO

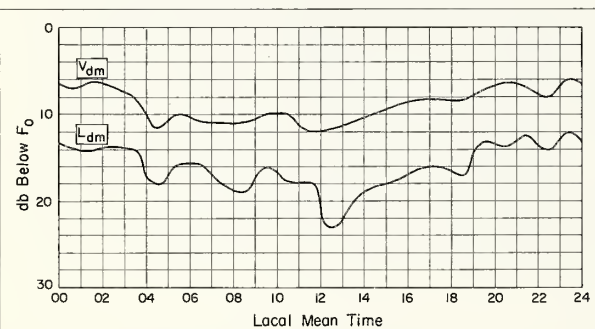
MAY 1957

51 kc  
BOULDER, COLORADO

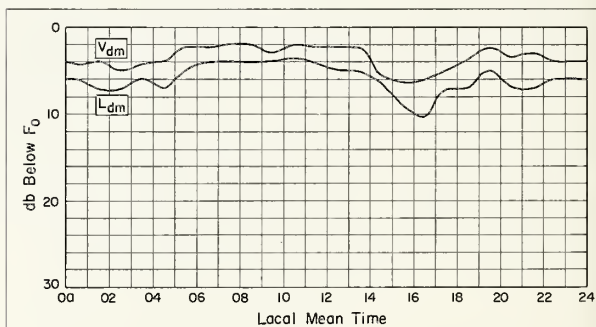
MAY 1957

246 kc  
BOULDER, COLORADO

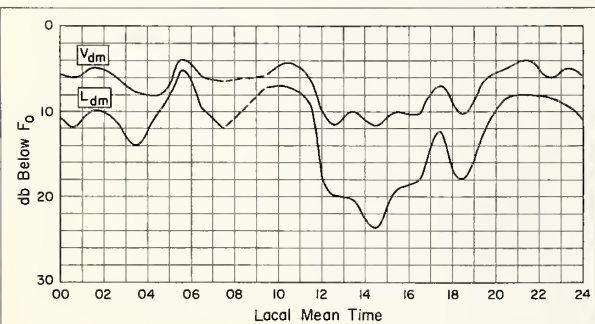
MAY 1957

113 kc  
BOULDER, COLORADO

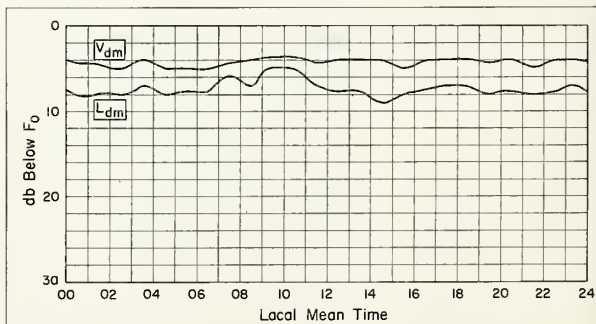
MAY 1957

2.5 Mc  
BOULDER, COLORADO

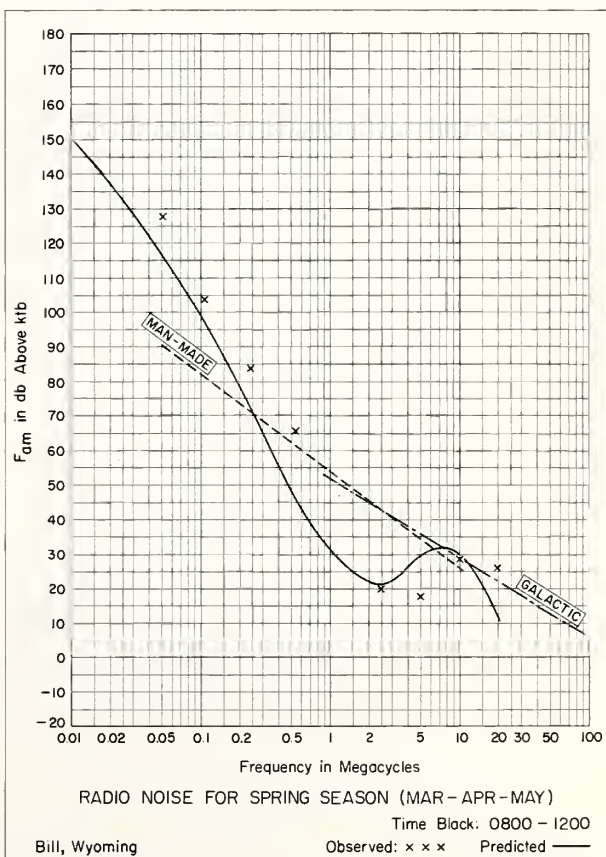
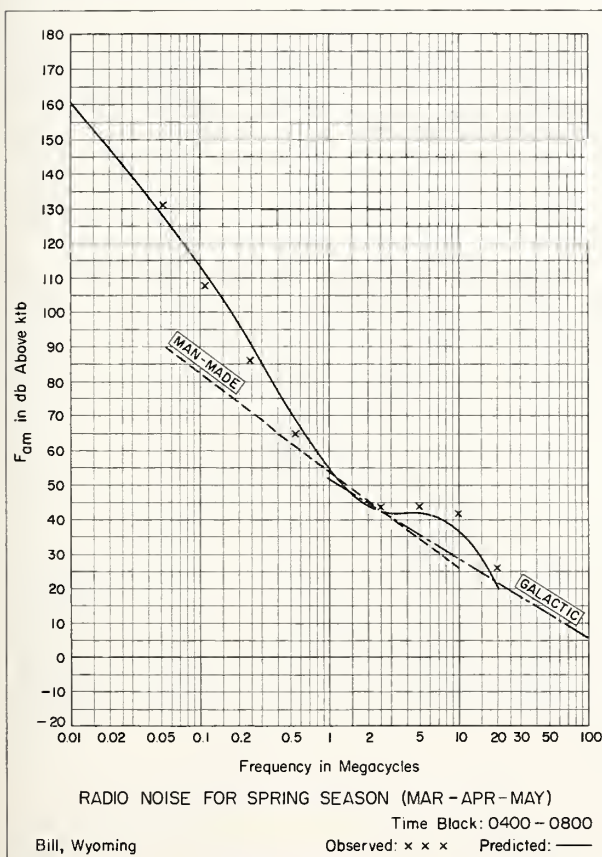
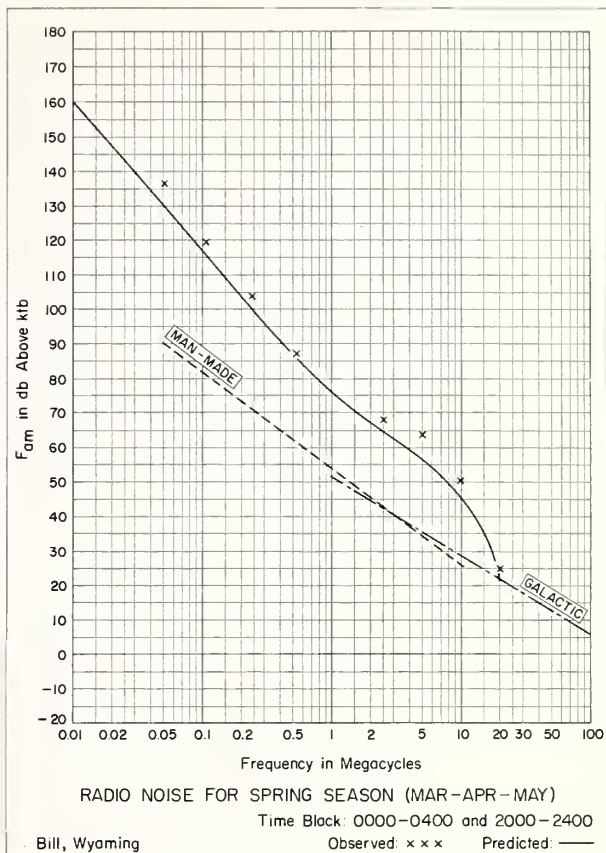
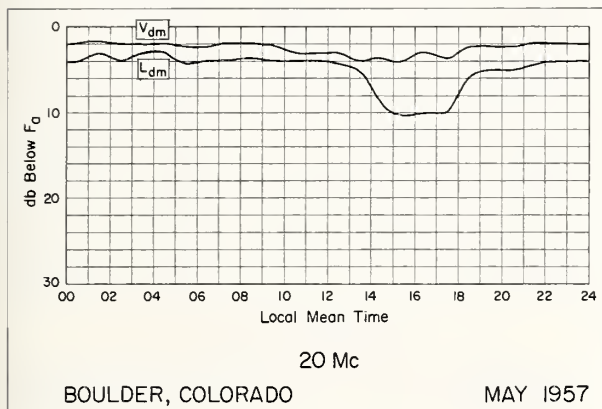
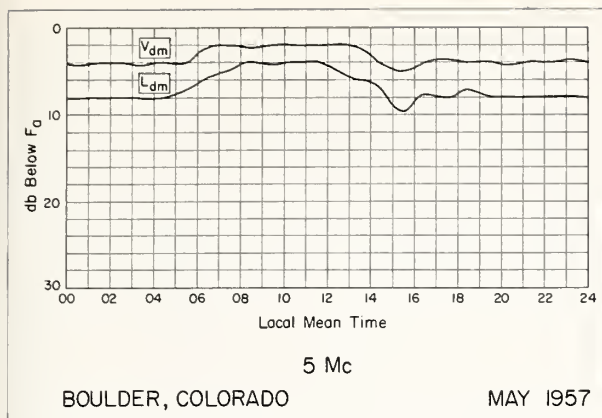
MAY 1957

545 kc  
BOULDER, COLORADO

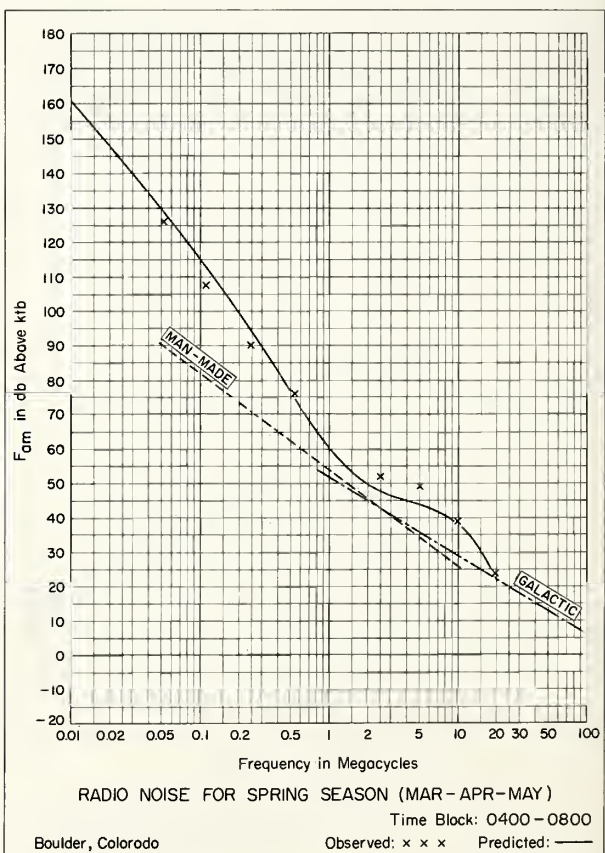
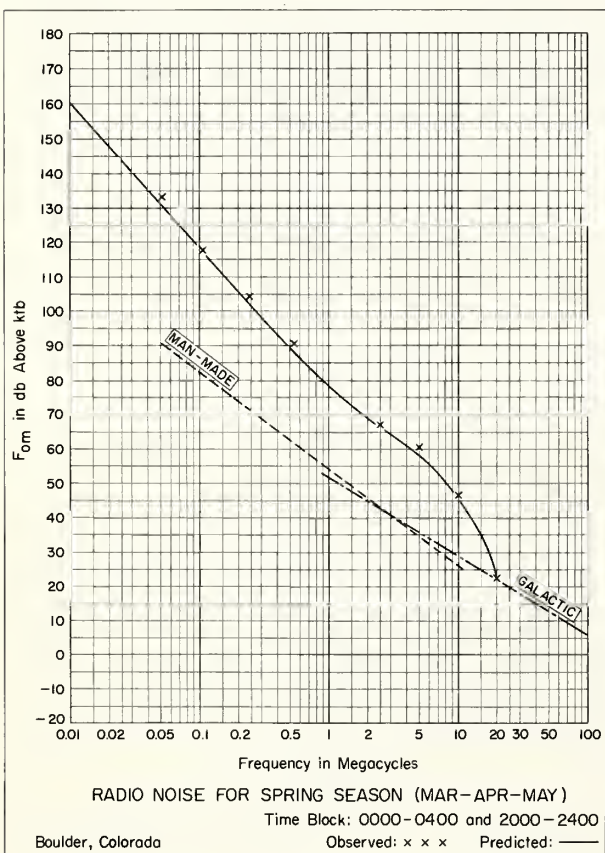
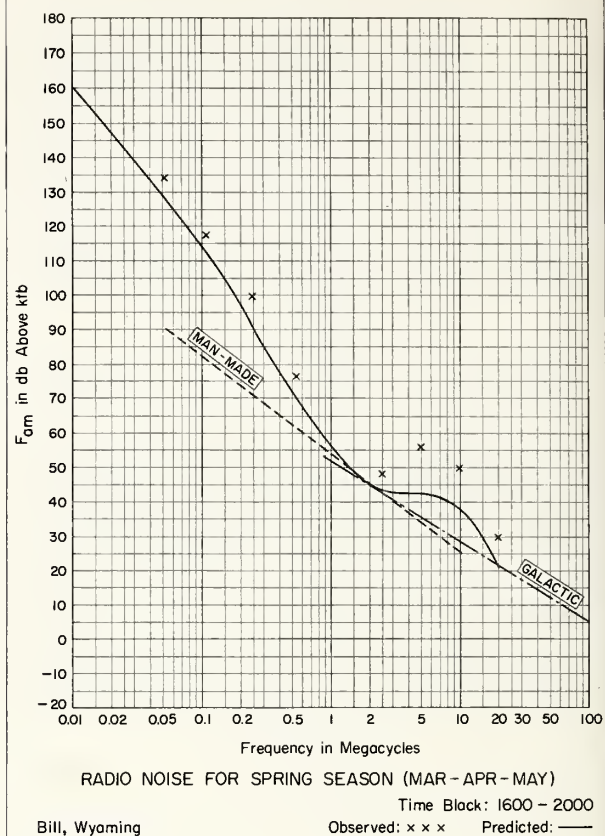
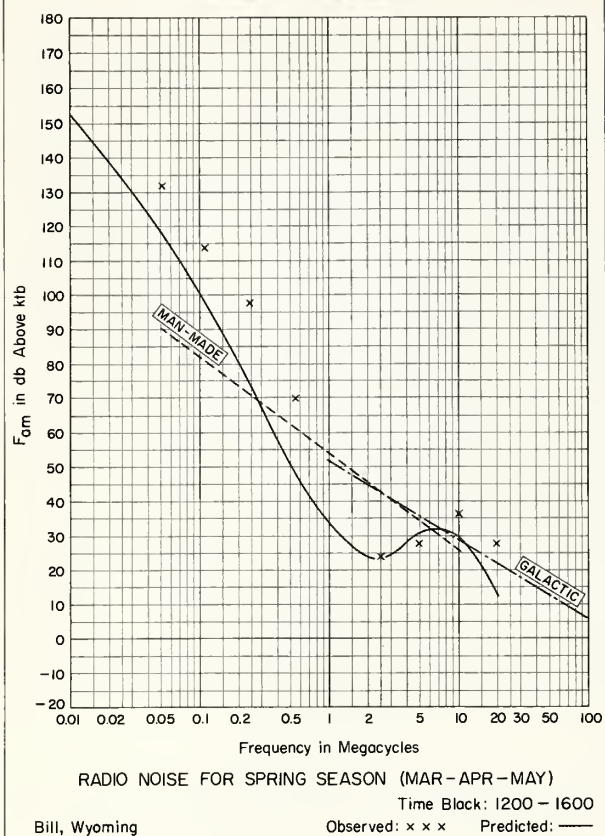
MAY 1957

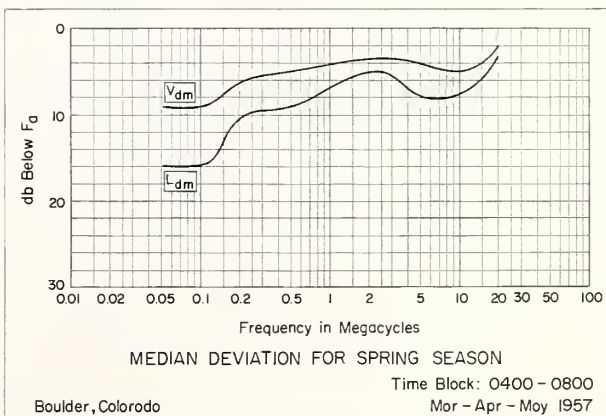
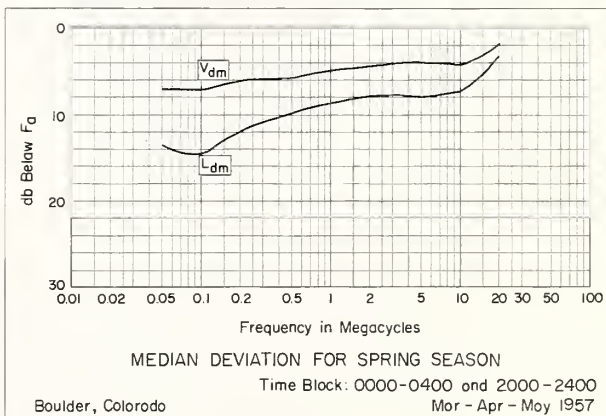
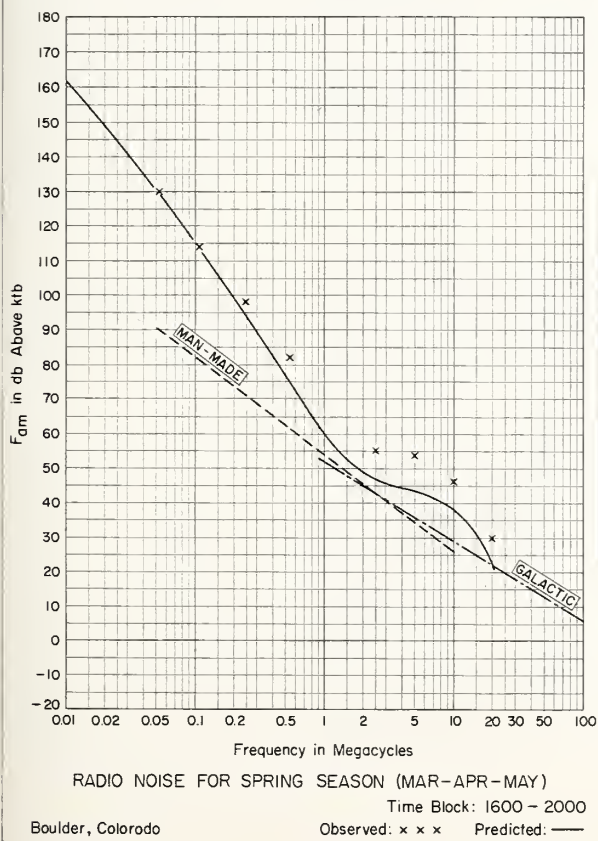
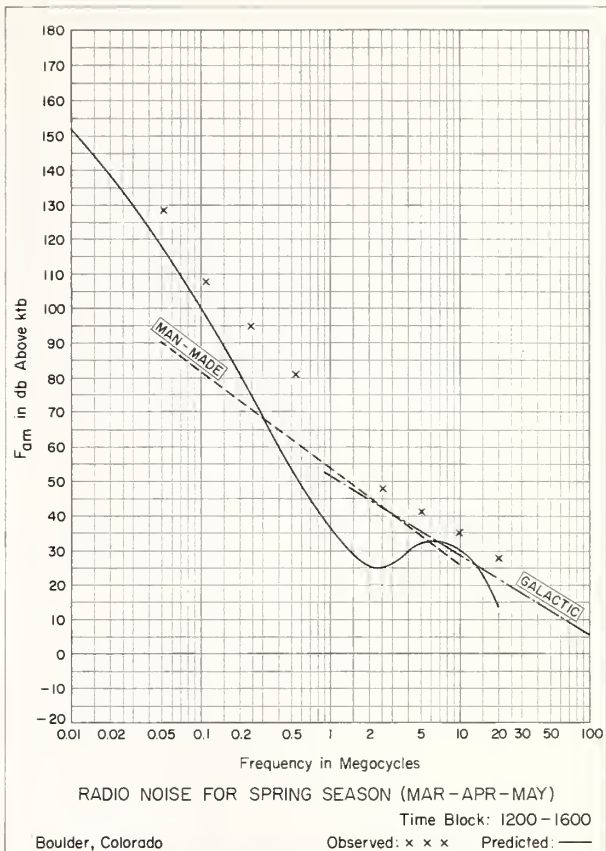
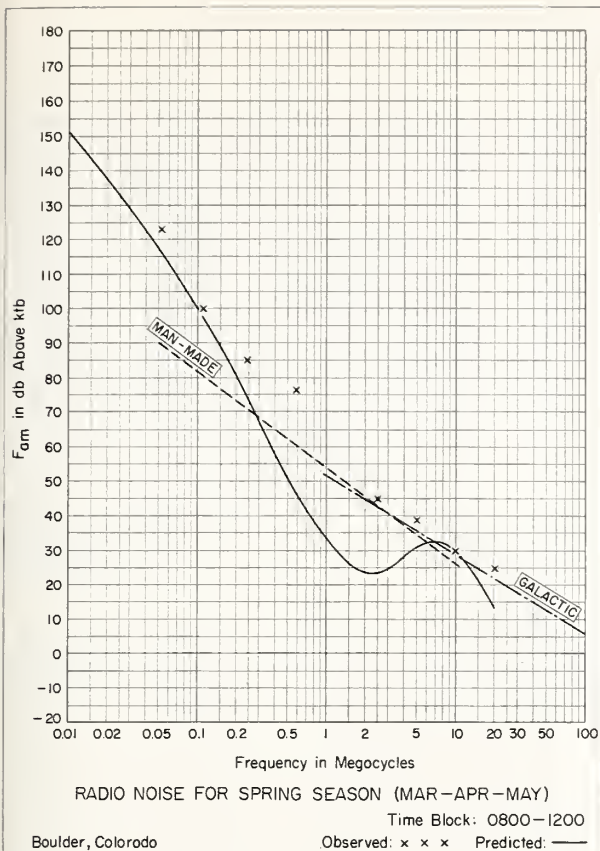
10 Mc  
BOULDER, COLORADO

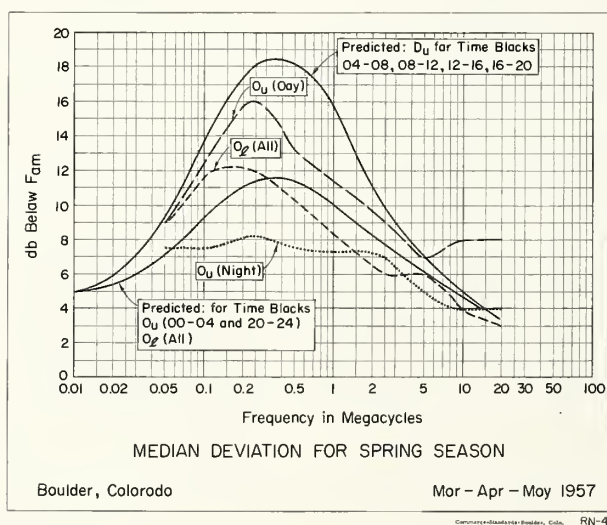
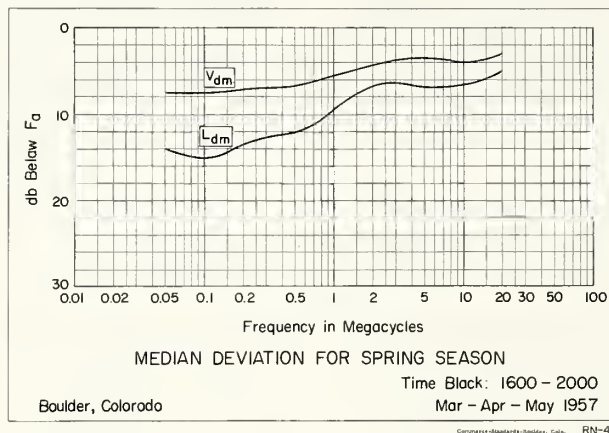
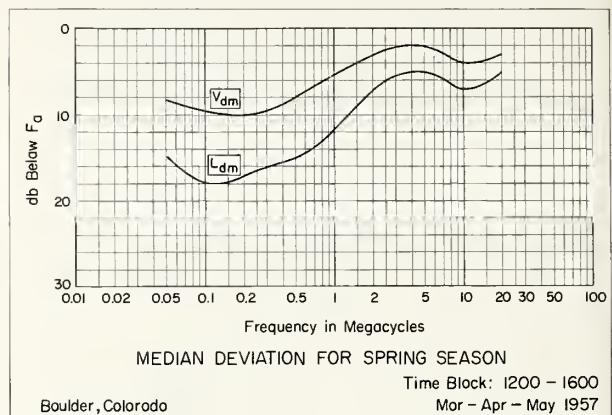
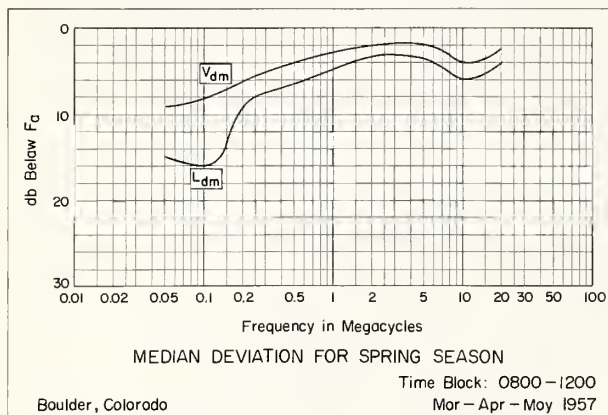
MAY 1957













## TABLES OF IONOSPHERIC DATA

19

Table 1

Washington, D. C. (38.7°N, 77.1°W)

June 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		6.8	285				(2.1)	2.60
01		6.4	290				(2.4)	2.60
02		6.0	290				3.0	2.60
03		5.6	290				(3.1)	2.60
04		5.2	290				(2.2)	2.60
05		5.2	280		121	1.80		2.70
06	(390)	6.0	250	4.0	111	2.50	2.7	2.70
07	440	6.3	240	4.6	109	3.15	3.3	2.65
08	480	6.5	230	5.1	105	3.45	4.0	2.60
09	515	6.9	220	5.2	105	(3.75)	4.2	2.50
10	500	7.0	210	5.3	105	(3.90)	4.2	2.45
11	515	7.0	210	5.5	105	4.00	4.4	2.45
12	510	7.0	220	5.5	109	(4.00)	4.3	2.45
13	500	7.0	220	5.6	105	4.00	4.2	2.45
14	515	7.0	220	5.5	108	4.00		2.40
15	480	7.0	220	5.4	105	3.85	3.9	2.50
16	440	7.2	230	5.3	109	3.60	3.7	2.50
17	400	7.2	235	4.9	109	3.30		2.60
18	340	7.4	250	4.5	111	2.80	3.2	2.65
19	<300	7.2	275		119	2.00	2.6	2.70
20		7.4	280				2.8	2.65
21		7.6	280				(2.8)	2.60
22		7.4	280				(3.4)	2.60
23		7.0	<300				(2.5)	2.60

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 2

Oslo, Norway (60.0°N, 11.1°E)

May 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		7.0	305				(2.2)	2.50
01		7.0	315				(2.1)	2.45
02		6.6	305				(2.0)	2.45
03		6.2	315				(2.3)	2.45
04		6.2	295			1.80	2.4	2.55
05		6.6	255		105	2.30	3.0	2.70
06		6.8	250		105	2.70	3.2	2.75
07	(410)	7.0	245	----	105	3.00	3.7	2.60
08	420	7.4	245	----	100	3.30	3.8	2.55
09	435	7.5	240	5.20	100	3.45	3.8	2.55
10	450	7.6	240	5.45	100	3.60	4.0	2.50
11	450	7.6	235	5.50	100	3.65	3.9	2.55
12	450	7.5	225	5.50	100	3.75	3.9	2.50
13	450	7.9	225	5.60	100	3.75	3.8	2.50
14	445	7.9	230	5.45	100	3.70	3.8	2.55
15	450	7.8	240	----	100	3.70		2.55
16	(450)	7.8	245	----	105	3.45		2.55
17	----	7.8	250		105	3.15	3.4	2.70
18		8.0	250		105	2.80	3.3	2.70
19		8.0	255		110	2.40	3.0	2.75
20		7.6	260		----	2.00	2.6	2.70
21		7.8	265		----	----	(2.0)	2.70
22		7.5	285				(2.2)	2.55
23		7.4	300				(2.4)	2.55

Time: 15.0°E.

Sweep: 0.7 Mc to 25.0 Mc in 5 minutes, automatic operation.

Table 3

Upsala, Sweden (59.8°N, 17.6°E)

May 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		6.6	315				2.2	2.4
01		6.3	310				2.3	2.4
02		6.0	310			E	3.0	2.4
03	----	6.2	305	----		E	3.5	2.4
04	340	6.4	270	3.60	130	1.80	3.3	2.5
05	350	6.7	250	4.25	115	2.45	3.5	2.6
06	345	7.0	245	4.70	110	2.85	4.1	2.6
07	390	7.2	240	5.10	105	3.15	4.8	2.5
08	400	7.4	240	5.30	105	3.35	5.9	2.5
09	415	7.4	240	5.50	105	3.50	5.2	2.4
10	410	7.6	225	5.50	105	3.60	6.5	2.5
11	425	7.7	225	5.65	105	3.70	5.5	2.4
12	425	7.9	225	5.70	105	3.70	5.5	2.5
13	420	7.9	220	5.70	105	3.70	5.2	2.45
14	410	7.9	225	5.70	105	3.60	4.7	2.5
15	380	7.7	230	5.50	105	3.50	4.8	2.5
16	375	7.7	240	5.30	105	3.30	4.0	2.5
17	350	7.8	245	5.05	105	3.05	3.9	2.6
18	(340)	7.8	250	4.50	110	2.70	3.8	2.6
19	----	7.7	260	----	120	2.20	3.6	2.7
20		7.5	265			1.60	3.1	2.6
21		7.5	270			E	2.8	2.5
22		7.5	280			E	2.3	2.5
23		7.2	290				2.3	2.4

Time: 15.0°E.

Sweep: 1.4 Mc to 17.0 Mc in 6 minutes, automatic operation.

Table 4

Graz, Austria (47.1°N, 15.5°E)

May 1957

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	330	7.3						
01	330	7.2						
02	310	6.8						
03	330	6.5						
04	300	6.8						
05	260	7.1						
06	240	8.0	240		130	3.5	3.8	
07	240	8.3	230		125	3.4	3.8	
08	310	8.2	210	5.4	110	3.6	4.0	
09	310	8.7	220	5.5	110	3.8	4.5	
10	340	9.4	225	(6.3)	105	3.9	4.6	
11	350	9.4	210	(6.4)	105	3.9	4.5	
12	350	9.1	200	6.4	100		4.4	
13	365	9.1		6.3	120	3.9	4.0	
14	355	9.4	230	6.1	115	3.8	3.9	
15	350	9.4	225	(5.9)	130	3.8	3.8	
16	310	9.2	230	5.4	120	3.6	3.9	
17	250	9.0	240		120	3.5	4.1	
18	250	8.5	250				4.0	
19	255	8.4					4.0	
20	260	8.4					4.2	
21	280	8.0						
22	290	7.7						
23	300	7.8						

Time: 15.0°E.

Sweep: 2.5 Mc to 11.5 Mc in 2 minutes.

Table 5

Thule, Greenland (76.6°N, 68.7°W)

April 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		6.1	290		135	(1.85)		2.60
01		6.4	280		126	(1.90)		2.65
02	----	6.1	275		<136	(2.00)		2.70
03	----	5.9	270	----	121	2.10		2.65
04	----	5.8	280	----	117	2.30		2.70
05	(485)	6.0	265	3.6	117	2.50		2.70
06	(520)	5.5	260	4.1	113	2.70		2.60
07	(420)	6.0	260	4.2	111	2.85		2.70
08	450	6.3	245	4.5	111	3.00		2.75
09	410	6.3	250	(4.5)	113	3.10		2.60
10	460	6.0	240	4.5	111	3.20		2.50
11	520	6.0	240	4.5	111	3.25		2.45
12	450	6.2	230	4.5	109	3.15		2.45
13	465	6.4	235	4.6	111	3.15		2.40
14	450	6.2	240	4.5	111	3.05		2.45
15	420	6.4	250	4.4	111	3.00		2.50
16	425	6.6	250	4.3	116	2.85		2.55
17	430	6.7	255	4.0	115	2.65		2.55
18	(390)	6.2	265	3.7	119	2.50		2.55
19	----	6.6	270	----	120	2.30		2.60
20	----	6.9	275	----	121	2.10		2.60
21	----	7.0	<285	----	129	(1.90)		2.60
22		6.0	285		129	(1.85)		2.65
23		6.1	280		132	1.80		2.65

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 6

Point Barrow, Alaska (71.3°N, 156.8°W)

April 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		5.1						2.65
01		5.4						2.65
02		(5.7)						(2.65)
03		(5.8)						(2.60)
04		5.4						(2.65)
05		(5.6)						(2.60)
06		5.6		(4.0)				(2.50)
07		(6.0)	3.9	115				(2.60)
08		(5.9)	----	111	3.00			(2.55)
09		(5.5)	----	----	----			(2.30)
10		(5.7)	----	----	----			(2.35)
11		(5.8)	----	----	(3.50)			(2.40)
12		6.0	4.9	----	----			2.40
13		6.5	4.9	109	----			2.40
14		6.9	4.8	119	3.30			2.50
15		7.0	(4.6)	----	----			2.50
16		6.9	4.2	111	----			2.60
17		(6.9)	----	111	2.90			2.60
18		6.6	----	111	----			2.75
19		6.2	----	----	----			2.75
20		5.6	----	129	----			2.80
21		5.6	----	140	----			2.80
22		(5.3)	----	----	----			(2.70)
23		(5.0)	----	----	----			(2.60)

Time: 150.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 7

Anchorage, Alaska (61.2°N, 149.9°W)

April 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		4.8					2.4	2.40
01		5.1					2.6	2.35
02		(5.0)					2.5	(2.40)
03		(4.9)					3.6	(2.30)
04		(5.2)					2.1	(2.40)
05		5.6			123	2.10		(2.45)
06		(5.9)			3.8	119	2.45	(2.40)
07		6.3			4.3	117	2.95	2.45
08		6.4			4.5	115	3.20	2.40
09		6.9			4.8	113	3.30	2.40
10		6.6			5.0	113	3.50	2.35
11		6.7			5.2	111	3.55	2.40
12		7.0			5.3	109	3.50	2.40
13		7.5			5.4	110	3.50	2.45
14		7.9			5.5	111	3.50	2.50
15		8.2			5.0	113	3.30	2.50
16		8.0			---	114	3.10	2.55
17		8.4			---	115	2.75	2.65
18		8.0			---	117	2.30	2.70
19		7.8				145	(2.00)	2.75
20		7.0				---	---	2.65
21		5.7				---	---	2.60
22		(5.1)						(2.60)
23		5.4						2.55

Time: 150.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 8

Adak, Alaska (51.9°N, 176.6°W)

April 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		(5.7)						(2.50)
01		(5.5)						(2.45)
02		(5.3)						(2.35)
03		(5.2)						2.40
04		4.9						2.40
05		5.5						3.00
06		6.6			---	117	---	---
07		(460)			7.4	250	---	121 (2.35)
08		455			8.0	235	---	115 (2.90)
09		(480)			8.3	230	5.0	111 (3.35)
10		(490)			9.6	230	5.8	111 (3.50)
11		415			10.2	220	5.5	111 (3.70)
12		(515)			10.6	220	---	112 (3.80)
13		(535)			10.7	<230	5.5	113 (3.70)
14		(480)			10.4	235	---	115 (3.60)
15		---			10.2	240	---	112 (3.50)
16		10.2			240			111 3.00
17		10.0			250			117 2.70
18		9.7			250			120 (2.00)
19		9.3			255			131 ----
20		8.5			250			---
21		7.7			250			---
22		(6.7)			270			---
23		(6.2)			300			---

Time: 180.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 27 seconds.

Table 9

Ft. Monmouth, New Jersey (40.3°N, 74.1°W)

April 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		6.6	290					2.55
01		6.0	290					2.60
02		5.6	305					2.45
03		5.6	<300					2.50
04		5.4	<300					2.50
05		5.4	300		---	---	(1.9)	2.70
06		6.4	265		116	2.30		2.90
07		6.9	240		111	2.90		2.90
08		7.6	230		---	107	3.35	2.80
09		460	7.9	220	5.4	109	3.65	2.80
10		515	8.6	205	5.4	100	3.80	2.65
11		475	9.2	210	5.6	107	3.90	2.60
12		490	9.4	215	5.5	107	3.95	2.60
13		440	10.0	220	5.6	109	3.95	2.60
14		430	9.8	225	5.7	106	3.80	2.60
15		(475)	9.8	230	5.4	100	3.60	2.60
16		---	9.6	235	---	109	3.35	2.60
17		---	9.6	245	---	111	2.90	2.65
18		---	9.4	265	---	121	2.30	2.70
19		---	9.2	265				2.70
20		---	8.4	250				2.65
21		---	7.7	265				2.60
22		---	7.2	280				2.55
23		---	7.0	300				2.50

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 10

San Francisco, California (37.4°N, 122.2°W)

April 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		6.4	330					(2.4)
01		6.3	305					(2.0)
02		6.1	305					(2.0)
03		6.0	300					(1.9)
04		5.6	290					1.4
05		5.5	300					1.6
06		6.6	260		---	125	(2.10)	2.2
07		8.1	240		---	111	(2.75)	2.90
08		9.4	230		---	109	(3.20)	3.4
09		(435)	10.2	225	5.4	109	(3.50)	3.7
10		(430)	10.5	225	5.4	109	(3.70)	4.0
11		385	11.4	220	5.7	109	(3.90)	2.65
12		380	12.0	220	---	109	(3.90)	2.65
13		405	12.0	225	---	109	(3.90)	2.65
14		390	11.6	220	---	109	3.80	2.65
15		(450)	11.5	230	---	109	3.70	2.70
16		---	11.0	230	---	109	(3.40)	2.70
17		---	10.5	240	---	109	(2.95)	3.2
18		10.3	245		---	119	(2.25)	2.6
19		9.8	240		---	---	---	(2.1)
20		8.2	230					(2.2)
21		7.3	255					(2.1)
22		6.8	<200					(2.1)
23		6.4	290					(2.1)

Time: 120.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 11

Okinawa I. (26.3°N, 127.8°E)

April 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		14.6	270					(2.2)
01		14.1	270					(2.2)
02		13.1	250					(2.2)
03		11.5	235					(3.6)
04		9.4	240					2.70
05		8.4	255					(2.1)
06		8.0	280					(2.0)
07		10.3	240		115	(2.55)	2.7	3.00
08		11.6	235		111	3.15	3.5	2.90
09		12.6	230		109	3.60	4.1	2.75
10		13.5	220		109	(3.85)	4.2	2.70
11		14.4	220		109	(4.00)	4.3	2.65
12		---	15.0	215	109	(4.10)	4.6	2.60
13		380	15.6	230	---	109	(4.10)	4.6
14		380	15.9	220	---	111	(4.05)	4.3
15		380	16.2	230	(7.0)	110	3.95	4.0
16		355	16.5	230	---	111	3.65	2.60
17		(340)	16.5	245	---	111	3.20	3.4
18		---	16.4	260	---	117	2.45	3.2
19		---	15.6	270				(2.9)
20		---	(15.4)	280				(2.5)
21		---	16.8	290				(2.9)
22		---	16.7	285				(2.9)
23		---	15.8	280				(2.4)

Time: 135.0°E.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 12

Maui, Hawaii (20.0°N, 156.5°W)

April 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		11.2	265					2.90
01		10.5	260					2.95
02		9.4	250					2.90
03		7.8	250					2.70
04		7.0	275					2.65
05		6.8	300					2.55
06		---	7.1	290		125	1.50	2.60
07		---	9.2	240		117	2.45	2.6
08		---	11.0	240		111	3.10	3.4
09		---	12.3	230		109	3.60	3.9
10		---	12.8	225		109	3.80	4.0
11		---	14.0	220		109	4.00	4.2
12		(360)	14.8	225	---	109	4.10	4.4
13		380	15.1	230	---	109	4.20	4.4
14		370	15.1	230	---	109	4.10	4.2
15		380	15.1	230	---	109	3.95	4.5
16		360	15.1	240	---	109	3.60	4.2
17		(330)	15.0	250		114	3.10	(3.7)
18		---	14.7	260		119	2.30	(3.6)
19		---	14.0	260				(3.0)
20		---	13.6	270				(2.7)
21		---	13.4	270				(1.8)
22		---	12.0	270				(1.4)
23		---	11.5	280				---

Time: 150.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 13

Panama Canal Zone (9.4°N, 79.9°W)									April 1957
Time	h°F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2	
00		10.9	260					2.85	
01		9.0	240				(3.4)	2.85	
02		9.0	255				(2.0)	2.70	
03		8.6	265				(2.2)	2.70	
04		7.8	250					2.65	
05		6.8	240				(3.3)	2.65	
06		7.1	290		181	1.70		2.60	
07		9.5	245		119	2.60	(3.1)	2.85	
08	---	11.6	240		111	3.25		2.85	
09	---	13.0	230		109	3.70	3.8	2.70	
10	---	13.5	230		109	4.00	4.3	2.70	
11	---	14.0	225		109	4.20	4.4	2.60	
12	---	14.4	225		109	4.25		2.55	
13	(400)	14.4	225		109	4.25		2.55	
14	385	14.6	225		109	4.15	4.3	2.50	
15	380	14.4	230		109	4.00	4.4	2.55	
16	(350)	14.0	240		111	3.60	(4.4)	2.60	
17		13.0	250		111	3.00	(3.8)	2.60	
18		12.3	260		125	2.25	(3.3)	2.60	
19		12.5	280				(3.0)	2.60	
20		11.8	295				(2.5)	2.60	
21		11.8	280					2.65	
22		11.8	260					2.80	
23		11.4	250					2.85	

Time: 75.0°W.  
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 14

Thule, Greenland (76.6°N, 68.7°W)									March 1957
Time	h°F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2	
00		6.0	265					2.70	
01		6.0	270					2.70	
02		5.4	270					2.70	
03		5.5	275					2.70	
04		5.6	260					2.70	
05		5.6	265				---	1.70	2.00
06		5.8	260				121	1.85	2.85
07		5.9	260				121	2.10	2.85
08	---	6.2	260	---			117	2.20	2.05
09	(560)	6.8	250	4.0			113	2.50	2.75
10	400	6.0	250	4.2			111	(2.60)	2.75
11	(350)	7.0	250	4.0			111	2.65	2.70
12	(375)	7.0	250	---			112	2.70	2.60
13	(525)	7.1	240	---			111	2.65	2.65
14	(570)	7.3	<250	---			115	2.50	2.60
15	---	7.0	250	---			114	2.40	2.65
16	---	6.7	260	---			119	2.20	2.70
17	---	6.7	270	---			121	1.95	2.70
18	---	6.6	260	---			(125)	1.80	2.65
19	---	6.6	260	---			---	---	2.70
20	---	6.2	260	---					2.70
21		6.0	250						2.70
22		6.3	270						2.70
23		6.0	270						2.60

Time: 75.0°W.  
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 15

Resolute Bay, Canada (74.7°N, 94.9°W)									March 1957
Time	h°F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2	
00		6.0	270		---	---		---	
01		6.2	270		---	---		---	
02		5.2	260		---	---		---	
03		5.4	260		---	E		---	
04		5.3	270		170	1.2			
05	---	5.4	270		125	1.5	1.5	(2.7)	
06	---	6.0	280	---	120	1.7		(2.8)	
07	---	5.9	270	---	120	1.8		(3.0)	
08	(310)	6.0	260	---	110	2.1		(2.9)	
09	400	6.2	260	4.0	110	2.4		2.9	
10	380	6.2	260	4.0	110	2.6		2.9	
11	400	6.9	260	4.3	105	2.7		(3.0)	
12	330	7.1	260	4.3	110	2.8		2.75	
13	380	6.8	260	4.3	105	2.8		(2.8)	
14	340	6.4	260	4.2	105	2.8		(2.8)	
15	370	7.0	270	4.0	110	2.6		(2.6)	
16	380	7.0	270	3.8	110	2.5		(2.6)	
17	370	6.8	280	3.8	120	2.2		(2.6)	
18	---	6.5	280	---	125	1.9		(2.7)	
19	---	7.0	280	---	120	1.7	1.7	---	
20	---	6.0	290	---	135	1.5	1.5	---	
21	---	6.0	280	---	---	1.2	<1.4	---	
22	---	6.1	270	---	---	(1.2)		---	
23	---	6.2	270	---	---	---		---	

Time: 90.0°W.  
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 16

Lulea, Sweden (65.6°N, 22.1°E)									March 1957
Time	h°F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00	(325)	5.4						2.7	
01	320	5.1						2.7	
02	330	4.1						2.7	
03	325	5.2						1.7	
04	305	5.1							
05	275	5.8			---			---	
06	260	6.0			---		1.8		
07	250	7.0			120		2.4		
08	250	>7.7	---	---	110		2.7		
09	250	8.0	---	---	110		3.1		
10	240	>8.0	230	---	120		3.2		
11	240	>8.0	230	---	110		3.2		
12	240	>8.0	230	---	110		3.2		
13	240	>9.0	---	---	110		3.2		
14	240	>8.0	---	---	120		3.0		
15	240	>8.0	---	---	120		2.9		
16	240	>8.0			125		2.6		
17	250	>7.5			135		2.0		
18	250	>7.5			---		1.5		
19	250	>7.5			---		---		
20	(250)	>7.0							
21	(270)	(6.5)						2.5	
22	(280)	(3.8)						2.4	
23	---	(4.8)						2.8	

Time: 15.0°E.  
Sweep: 1.5 Mc to 10.0 Mc in 9 minutes, automatic operation.

Table 17

Fairbanks, Alaska (64.9°N, 147.8°W)									March 1957
Time	h°F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2	
00		(4.9)	(330)				3.8	(2.70)	
01		(4.8)	365				3.3	(2.65)	
02		(5.2)	(350)				3.3	(2.50)	
03		(5.1)	(340)				3.6	(2.60)	
04		(6.5)	(355)				4.6	(2.65)	
05		(6.2)	370				3.5	(2.60)	
06		(6.0)	310				1.9	(2.75)	
07	---	(6.0)	275	---	119	2.30		2.85	
08	---	6.4	250	---	119	2.70		2.95	
09	(440)	6.9	<245	4.5	116	2.90		2.85	
10	(480)	7.2	<240	4.6	113	3.10		2.80	
11	(435)	7.8	240	4.7	117	3.20		2.80	
12	(415)	9.0	230	(4.8)	115	3.25		2.80	
13	---	9.3	240	(5.0)	115	3.20		2.75	
14	---	9.8	240	---	121	3.15		2.75	
15	---	10.0	240	---	120	3.00		2.85	
16	---	10.2	240	---	121	2.60		2.80	
17	---	10.0	240	---	123	2.20		2.90	
18		8.6	250		140	1.75		2.90	
19		7.0	260				1.9	2.95	
20		(6.2)	255				2.0	(2.90)	
21		5.2	255				3.4	2.95	
22		(4.8)	275				3.1	(2.90)	
23		(4.4)	<340				3.3	(2.70)	

Time: 150.0°W.  
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 18

Reykjavik, Iceland (64.1°N, 21.8°W)									March 1957
Time	h°F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2	
00	---						3.5	---	
01	---						3.2	---	
02	---						3.5	---	
03	---						3.5	---	
04	(5.5)						3.0	(2.40)	
05	(5.4)							(2.50)	
06	(5.3)							2.65	
07	5.8				---			2.80	
08	6.6				---			2.90	
09	7.7				---			2.85	
10	8.6				119	(3.00)		2.80	
11	9.4				---			2.80	
12	10.2				---			2.70	
13	10.3				---			2.70	
14	10.1				119	3.30		2.75	
15	9.2				119	(3.05)		2.75	
16	7.8				121	(3.00)		2.75	
17	7.6				121	2.85		2.80	
18	(8.0)				120	2.70		(2.85)	
19	(6.8)				---			2.80	
20	(5.2)				---			3.0	(2.60)
21	(5.4)				---			4.2	(2.45)
22	(4.7)				---			(3.5)	(2.40)
23	(5.7)				---			3.5	(2.50)

Time: 15.0°W.  
Sweep: 1.0 Mc to 25.0 Mc in 16.2 seconds.

Table 19

Anchorage, Alaska (61.2°N, 149.9°W)								March 1957	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2	
00		(3.3)					1.6	(2.50)	
01		(3.7)					2.0	(2.35)	
02		(3.5)					(3.0)	(2.40)	
03		(3.8)					2.7	2.40	
04		(4.0)						(2.30)	
05		(4.6)						(2.35)	
06		(5.1)						(2.55)	
07		5.9		128					
08		6.6		125	(2.20)			2.60	
09		7.0		121	2.55			2.75	
10		8.0		119	2.85			2.65	
11		8.8		4.6	119	3.10		2.75	
12		9.2		119	(3.15)			2.65	
13		9.3		119	3.20			2.70	
14		10.0		118	3.20			2.65	
15		10.6		119	3.10			2.75	
16		10.6		121	3.00			2.70	
17		10.1		129	2.55			2.75	
18		10.0		120	2.30			2.80	
19		8.7						(2.00)	
20		6.4						2.00	
21		(4.8)						2.75	
22		(4.5)						(2.70)	
23		(3.9)						1.7	
								1.6	(2.45)

Time: 150.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 20

Narsarssuak, Greenland (61.2°N, 45.4°W)								March 1957	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2	
00		(6.0)						3.3	
01		---						3.0	---
02		---						2.8	---
03		(4.5)						3.6	---
04		(4.2)						3.6	---
05		(4.6)						2.4	(2.65)
06		(5.0)						---	(2.75)
07		(6.2)	<295					131	(2.30)
08		6.8	270					119	2.80
09		7.5	250					119	3.00
10		8.0	240					119	3.20
11	(420)	8.6	240					119	3.20
12	(395)	9.7	240					4.9	118 3.30
13	345	9.8	240					4.9	117 3.25
14	425	(8.7)	250					4.6	113 3.20
15	(400)	8.4	250					4.4	115 (3.00)
16	(315)	(7.8)	260					---	117 2.80
17	---	(6.8)	300					---	119 2.70
18		(6.0)	310					135	2.55 3.0
19		(6.8)	310					131	(1.80) 3.1
20		(5.6)	330					---	---
21		(6.4)	335					---	2.9
22		---	330					---	2.9
23		(4.8)	350					---	2.0

Time: 45.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 21

Adak, Alaska (51.9°N, 176.6°W)								March 1957	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2	
00		(4.4)	335					2.45	
01		(4.1)	340					2.40	
02		(4.1)	350					2.35	
03		(4.2)	350					(2.35)	
04		(4.1)	330					2.40	
05		4.0	320					2.50	
06		5.4	270					129	(1.90)
07		7.5	240					119	(2.50)
08		9.0	230					113	2.90
09		11.2	230					111	(3.20)
10		12.0	225					111	3.40
11		(375)	12.6	225				110	3.50
12		(300)	13.0	225				110	3.55
13		---	12.7	230				111	3.55
14		---	12.0	230				110	3.40
15		---	11.9	230				115	3.20
16		---	11.6	240				119	(2.90)
17		---	10.8	240				121	(2.35)
18		---	10.0	235				139	(1.75)
19		---	8.8	235				---	---
20		---	7.2	235				---	---
21		---	6.0	250				---	---
22		---	5.1	<280				---	---
23		---	4.7	300				---	---

Time: 180.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 27 seconds.

Table 22

Ottawa, Canada (45.4°N, 75.9°W)								March 1957	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2	
00		5.8	300					<1.5	(2.65)
01		5.6	300					<1.6	(2.7)
02		5.1	300					<1.8	(2.5)
03		5.0	310					<1.6	(2.5)
04		4.5	300					<1.5	(2.6)
05		4.5	300					<1.5	(2.6)
06		5.0	290					110	1.7
07		7.0	260					110	2.3
08	290	8.7	240					110	2.9
09	280	9.2	220					105	3.3
10	260	10.2	220					105	3.4
11	270	11.2	220					105	3.7
12	280	11.9	220					105	3.8
13	300	11.7	220					105	3.8
14	290	11.8	230					105	3.6
15	290	11.7	230					105	3.4
16	300	11.6	240					105	3.0
17	(300)	11.2	250					110	2.6
18		11.0	240					120	2.0
19		10.0	250					---	---
20		8.0	260					---	---
21		7.0	270					---	---
22		6.1	280					---	---
23		5.5	300					---	---

Time: 75.0°W.

Sweep: 1.0 Mc to 20.0 Mc in 15 seconds.

Table 23

Ft. Monmouth, New Jersey (40.3°N, 74.1°W)								March 1957	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2	
00		6.9	280					2.70	
01		6.4	275					2.65	
02		6.2	275					2.65	
03		5.7	275					2.65	
04		5.3	275					2.60	
05		5.6	270					2.65	
06		5.8	270					2.85	
07		7.9	235					133	1.80
08		10.0	230					115	2.35
09		10.7	220					109	3.00
10		11.7	210					109	3.35
11	(360)	12.1	210					107	3.55
12	(370)	12.2	215					109	3.75
13	(420)	12.5	220					109	3.85
14	(410)	11.9	220					110	3.80
15	---	11.8	225					109	3.70
16	---	11.9	235					109	3.50
17	---	11.5	240					111	3.15
18		11.1	240					149	2.55
19		10.0	230					---	---
20		9.2	245					---	---
21		8.5	250					---	---
22		7.7	265					---	---
23		7.2	275					---	---

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 24

San Francisco, California (37.4°N, 122.2°W)								March 1957	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2	
00		5.4	290					2.50	
01		5.4	300					2.50	
02		5.6	290					2.55	
03		5.6	<300					2.55	
04		5.4	280					2.60	
05		5.2	290					2.60	
06		(5.6)	280					---	---
07		(8.3)	240					119	>2.20
08		>10.5	230					109	2.85
09		(12.0)	220					109	(3.20)
10		(12.5)	210					113	(3.55)
11	(315)	12.7	210					113	>3.45
12		>13.0	215					115	3.80
13		>13.0	220					109	3.80
14		>13.0	225					115	3.70
15		13.0	230					115	3.55
16		(12.5)	235					115	(3.15)
17		12.4	240					115	(2.70)
18		(11.6)	230					---	---
19		10.2	220					---	---
20		8.8	230					---	---
21		7.7	235					---	---
22		6.6	245					---	---
23		5.8	260					---	---

Time: 120.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.



**Table 25**

Baguio, P. I. (16.4°N, 120.6°E)      March 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		14.4	240					3.00
01		13.0	230					3.20
02		10.1	220					3.15
03		8.4	220					2.85
04		7.4	245				1.7	2.80
05		6.4	245				2.0	2.85
06		7.4	270				2.1	2.85
07		10.8	255				2.9	2.95
08		13.0	245		119	(2.55)	3.20	3.6
09		14.2	235		111	(3.60)	3.9	2.55
10		14.2	220		111	(3.90)		2.35
11		13.8	220		111	(4.00)		2.20
12		13.2	210		111	(4.10)		2.15
13		13.5	210		111	4.05		2.20
14		13.6	215		111	4.00		2.30
15		14.4	230		111	3.70		2.35
16		14.3	240		114	3.30		2.35
17		14.2	255		117	(2.65)		2.35
18		13.8	295		---	---	(2.3)	(2.25)
19		>12.8	400		---	---	(2.0)	(2.15)
20		>12.8	375					2.20
21		>13.0	300					(2.50)
22		14.0	260					(2.80)
23		14.3	250					2.95

Time: 120.0°E.  
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

**Table 27**

Tromsø, Norway (69.7°N, 19.0°E)      February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		---	(355)		---	---	(3.3)	---
01		(5.0)	(330)		---	---	(3.2)	(2.50)
02		(5.6)	(340)		---	---	3.3	(2.45)
03		(5.6)	(330)		---	---	2.8	(2.50)
04		(4.8)	(305)		---	---	2.9	(2.55)
05		5.4	310		---	---	2.8	2.60
06		5.0	295		---	---	2.4	2.70
07		5.6	290		---	1.30		2.70
08		6.3	260		140	1.70		2.85
09		8.6	250		---	---		2.90
10	(255)	9.8	245		---	2.05		2.90
11	250	11.5	---		---	2.30		2.90
12	245	11.6	(245)		---	2.25		2.90
13	(250)	10.8	245		---	2.25		2.90
14		10.8	245		---	2.15		3.00
15		10.5	240		---	2.00	2.1	3.05
16		8.6	240		145	1.90		2.90
17		(5.4)	245		135	1.45	2.2	2.90
18		5.6	250		130	1.90	2.2	2.90
19		5.1	(245)		---	---	3.2	2.90
20		5.5	(280)		---	---	3.0	(2.60)
21		(5.7)	300		---	---	3.0	---
22		(5.6)	(290)		---	---	2.9	---
23		(5.7)	(315)		---	---	3.1	---

Time: 15.0°E.  
Sweep: 0.7 Mc to 25.0 Mc in 5 minutes, automatic operation.

**Table 29**

Luleå, Sweden (65.6°N, 22.1°E)      February 1957

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(325)	(4.4)					2.0	
01	310	(4.2)					2.7	
02	300	(4.0)					2.6	
03	300	(4.3)						
04	290	4.4						
05	280	5.8						
06	260	4.4						
07	250	5.8			---	---		
08	240	7.0			---	1.8		---
09	240	>7.9			---	2.1		---
10	240	>8.0			---	2.5		---
11	230	>8.0	---		---	2.5		---
12	230	>8.2			120	2.7		---
13	230	>8.0			---	2.6		
14	230	>8.0			140	2.4		
15	230	>8.0			---	2.1		
16	220	>8.0			---	1.8		
17	220	>7.1			---	---		
18	240	6.2						
19	240	>6.9						
20	(290)	>6.5						
21	(260)	(4.3)						
22	(270)	(4.0)					2.6	
23	(300)	(4.0)					2.8	

Time: 15.0°E.  
Sweep: 1.5 Mc to 10.0 Mc in 9 minutes, automatic operation.

**Table 26**

Resolute Bay, Canada (74.7°N, 94.9°W)      February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		5.3	260					---
01		5.2	260				<1.4	(2.9)
02		5.0	260		---	---	<1.5	---
03		5.0	260		---	---	<2.2	---
04		5.0	270		---	---	<1.8	(2.9)
05		4.0	280		---	---	<1.8	---
06		4.8	270		---	---	<1.6	---
07		4.9	260		---	---	<1.4	---
08		5.2	260		150	1.4	1.4	---
09		5.6	270		105	1.7	1.8	---
10		6.0	260		110	1.0		3.05
11		7.0	260		105	2.0		(2.8)
12		8.0	260		100	2.0		2.9
13		7.0	260		100	2.0		3.0
14		6.7	260		105	1.9		(2.85)
15		7.2	260		115	1.8		(2.9)
16		7.4	260		145	1.7	1.7	(2.95)
17		7.2	260		140	1.6		---
18		6.3	260		---	1.4		---
19		5.0	270		---	---		---
20		6.2	270				<1.2	---
21		6.0	270					---
22		5.8	260				<1.4	---
23		5.4	260					---

Time: 90.0°W.  
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

**Table 28**

Kiruna, Sweden (67.0°N, 20.3°E)      February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		4.7	350				(2.9)	2.5
01		5.2	355				(3.1)	2.6
02		6.0	350				(3.6)	(2.5)
03		6.0	320				(3.3)	2.6
04		5.7	310		---	---	(2.0)	2.6
05		5.9	295		---	---	2.0	2.6
06		5.2	280		---	E	2.0	2.7
07		5.4	260		---	E		2.8
08		6.8	255		---	1.6		2.85
09		8.4	250		---	2.0		2.9
10		9.8	240		---	2.1		2.9
11		11.0	240		---	2.3		2.9
12		11.2	240		---	2.4		2.9
13		11.0	240		---	2.4		2.9
14		10.1	240		---	2.3		3.0
15		9.5	240		---	2.0		3.0
16		8.9	235		---	1.4		3.0
17		7.8	240		---	E		3.0
18		(5.0)	240		---	E	2.0	2.6
19		5.5	265		---		2.3	2.8
20		5.1	300		---		(3.5)	(2.8)
21		5.0	300		---		(3.2)	2.55
22		(5.8)	310		---		(2.9)	(2.6)
23		(5.0)	335		---		(3.1)	(2.5)

Time: 15.0°E.  
Sweep: 0.8 Mc to 14.0 Mc in 30 seconds.

**Table 30**

Baker Lake, Canada (64.3°N, 96.0°W)      February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		5.3	250				5.1	
01		4.9	260				4.0	---
02		4.4	270				4.2	---
03		5.0	270				3.8	---
04		4.2	290		---	---	2.6	---
05		4.2	300		120	1.5	3.4	---
06		4.0	300		---	1.4	4.0	---
07		4.3	300		130	(1.8)	3.9	---
08		4.8	280		120	2.0	3.8	---
09		5.5	270		110	2.4	<3.8	---
10		6.0	260		110	2.8		3.1
11		7.1	260		120	3.0		2.9
12		8.3	260		115	2.8		2.9
13		10.0	250		110	2.8		2.9
14		9.8	250		110	2.7		2.9
15		8.0	250		120	2.5		2.9
16		7.4	260		115	2.2		2.8
17		6.6	260		125	2.0	3.1	(2.7)
18		6.0	280		130	2.0	3.5	---
19		5.4	270		130	1.8	<3.1	---
20		5.0	260		---	1.8	5.0	(2.5)
21		5.2	270		---	1.4	3.4	---
22		5.3	260		---	---	5.1	---
23		5.2	260		---	---	4.5	(2.85)

Time: 90.0°W.  
Sweep: 1.0 Mc to 16.0 Mc in 16 seconds.

Table 31

Reykjavik, Iceland (64.1°N, 21.8°W) February 1957							
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs (M3000)F2
00		---					3.2
01		---					3.6
02		---					3.7
03		---					3.8
04		---					3.0
05		(4.0)					2.6
06		(4.0)					(2.65)
07		(4.6)					(2.75)
08		5.6					2.80
09		7.1		---	---		3.00
10		8.9		---	---		3.00
11		10.2		---	---		3.00
12		10.8		---	---		3.00
13		11.0		---	---		3.00
14		10.9		---	---		3.00
15		10.4		---	---		2.95
16		(9.6)		---	---		3.00
17		(7.8)		---	---		(3.00)
18		(6.8)				2.6	(2.90)
19		(5.3)				2.7	(2.65)
20		(5.4)				2.8	(2.80)
21		---				2.9	
22		---				3.3	---
23		---				3.7	---

Time: 15.0°W.  
Sweep: 1.0 Mc to 25.0 Mc in 16.2 seconds.

Table 32

Nurmijarvi, Finland (60.5°N, 24.6°E) February 1957							
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs (M3000)F2
00		3.7					(2.85)
01		3.8					(2.90)
02		(2.8)					(3.00)
03		(3.0)					(2.95)
04		(2.6)					(3.00)
05		(2.5)					(3.10)
06		2.8					(3.10)
07		4.5					(3.20)
08		5.8					3.30
09		8.3				---	3.40
10		10.3				---	3.40
11		11.4				---	3.30
12		11.9				---	3.40
13		12.1				---	3.40
14		12.5				---	3.40
15		12.3				---	3.35
16		11.4				2.3	3.40
17		11.2				---	3.50
18		9.4				---	3.40
19		7.7				---	3.40
20		5.4				---	3.25
21		4.9				---	3.10
22		4.2				---	(3.10)
23		4.5				---	(3.25)

Time: 30.0°E.  
Sweep: 1.0 Mc to 25.0 Mc in 1 minute.

Table 33

Churchill, Canada (58.8°N, 94.2°W) February 1957							
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs (M3000)F2
00		4.6	300		130	2.0	5.0
01		5.0	300		140	2.0	6.0
02		4.3	320		120	2.0	4.8
03		5.0	320		130	2.0	5.0
04		4.3	340		120	2.0	4.5
05		4.8	360		120	(2.5)	4.0
06		(4.3)	340		115	2.8	4.0
07		5.1	320		120	3.0	4.0
08		6.0	300		110	3.0	(2.95)
09		7.3	270		110	3.0	3.0
10	---	8.7	260		110	3.0	3.0
11	---	10.0	260	---	120	3.0	2.9
12	---	11.0	250	---	120	3.0	2.8
13	---	12.0	250	---	120	3.1	2.9
14	---	12.2	250	---	120	3.0	2.8
15	---	12.0	260	---	120	2.8	2.9
16	---	12.0	250	---	125	2.5	2.9
17		10.5	260		130	2.0	2.9
18		7.4	300		130	2.0	<3.0
19		(6.0)	300		120	(2.4)	2.7
20		5.9	300		120	2.8	3.0
21		5.6	300		125	2.6	4.6
22		(5.2)	300		130	2.7	6.4
23		5.0	300		130	2.0	4.8

Time: 90.0°W.  
Sweep: 1.0 Mc to 17.0 Mc in 16 seconds.

Table 34

De Bilt, Holland (52.1°N, 5.2°E) February 1957							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs (M3000)F2
00		300	4.6				2.5
01		320	4.3				2.5
02		320	4.2				2.5
03		310	4.0				2.5
04		300	3.6				2.6
05		(290)	3.3				2.7
06		280	3.5				2.7
07		230	6.0		---	E	3.05
08		210	9.2		---	2.5	3.2
09		210	10.9	---	115	2.8	3.1
10		210	12.2	---	110	3.0	3.05
11		210	13.0	210	---	110	3.2
12		210	13.2	210	---	110	3.3
13		215	12.8	210	---	110	3.2
14		215	12.3	210	---	110	3.0
15		215	12.0		115	2.8	3.0
16		210	12.0		---	2.4	3.0
17		210	10.6				3.0
18		210	9.0				3.0
19		220	7.2				3.0
20		250	6.0				2.85
21		260	5.4				2.7
22		295	5.0				2.7
23		300	4.8				2.7

Time: 0.0°.  
Sweep: 1.4 Mc to 16.0 Mc in 40 seconds.

Table 35

Lindau/Harz, Germany (51.6°N, 10.1°E) February 1957							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs (M3000)F2
00		300	4.65				<2.5
01		295	4.40				2.9
02		300	4.30				2.8
03		305	4.10		---	E	2.6
04		300	3.95		---	E	2.5
05		280	3.50		---	E	2.6
06		280	3.30		---	E	2.5
07		260	4.40		---	E	3.0
08		235	7.95		---	2.05	3.2
09		230	10.05		115	2.60	3.9
10		225	11.65		110	2.90	3.6
11		230	12.95		110	3.10	3.9
12		230	13.25		115	3.25	4.0
13		230	13.40		110	3.20	3.9
14		230	13.10		110	3.10	3.8
15		230	12.70		110	2.90	3.9
16		225	12.30		115	2.60	3.9
17		225	11.70		120	2.00	3.5
18		220	10.50		---	E	2.9
19		220	8.35		---	E	2.8
20		230	6.80		---	E	2.6
21		250	5.90				2.6
22		270	5.25				2.4
23		290	5.00				2.8

Time: 15.0°E.  
Sweep: 1.0 Mc to 16.0 Mc in 4 minutes.

Table 36

Winnipeg, Canada (49.9°N, 97.4°W) February 1957							
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs (M3000)F2
00		4.8	290				<1.5
01		4.5	290				<1.5
02		4.4	310				<1.5
03		4.4	310				3.2
04		4.0	310				<2.5
05		4.5	310				<1.5
06		4.1	300				<1.5
07		4.2	280				<1.5
08		6.2	260		120	1.9	3.0
09		8.6	250		115	2.5	3.1
10	---	10.1	240		115	3.0	3.0
11	---	11.1	240		115	3.1	3.0
12	(260)	11.9	240		115	3.2	2.9
13	(270)	12.0	240		115	3.2	2.9
14	(270)	12.4	240		115	3.1	2.9
15	---	12.4	240		120	3.0	2.9
16		12.4	240		120	2.7	2.9
17		12.0	240		130	2.3	2.9
18		11.0	240		---	1.7	3.0
19		9.8	230				<1.5
20		8.4	240				<1.5
21		6.8	250				<1.5
22		5.6	270				<1.5
23		5.0	280				<1.5

Time: 90.0°W.  
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 37

Schwarzenburg, Switzerland (46.8°N, 7.3°E)

February 1957

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	5.3						3.0
01	300	5.1						2.9
02	300	5.0						2.85
03	300	4.8						2.9
04	300	4.6						3.0
05	290	4.2						3.0
06	280	3.8						3.0
07	240	4.3						3.2
08	200	8.3			100	2.0		3.5
09	200	11.4			100	2.5		3.5
10	200	12.6			100	2.9		3.5
11	200	13.8			100	3.2		3.5
12	200	13.6			100	3.3		3.4
13	200	13.9			100	3.4		3.4
14	200	13.5			100	3.3		3.4
15	200	13.4			100	3.1		3.4
16	200	12.8			100	2.8		3.4
17	200	12.0			100	2.3		3.4
18	200	11.0						3.5
19	200	9.5						3.45
20	200	7.8						3.5
21	215	6.7						3.3
22	255	6.1						3.1
23	250	5.8						3.1

Time: 15.0°E.

Sweep: 1.0 Mc to 25.0 Mc in 30 seconds.

Table 38

Ottawa, Canada (45.4°N, 75.9°W)

February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		5.8	280				<1.5	2.7
01		5.2	280				<1.5	2.65
02		5.1	290				<1.5	2.7
03		5.0	300				<1.4	2.7
04		4.9	280				<1.5	2.75
05		4.8	280				<1.4	2.7
06		4.7	270				<1.5	2.05
07		5.8	260			1.7		3.0
08	---	8.4	240		110	2.3		3.1
09	---	10.8	230		110	3.0		3.1
10	(250)	12.1	230	---	110	3.2		3.0
11	250	12.8	230	---	110	3.4		3.0
12	250	13.0	230	---	110	3.5		2.9
13	250	12.8	230	---	110	3.5		2.9
14	260	12.8	230	---	110	3.3		2.9
15	---	12.8	240		110	3.1		2.9
16	---	12.2	240		110	2.7		2.9
17		11.9	240		130	2.1		3.0
18		11.2	230		---	1.5		3.0
19		9.4	230				<1.4	2.9
20		8.1	230				<1.5	2.85
21		7.2	250				<1.5	2.8
22		6.7	250				<1.5	2.8
23		6.0	260				<1.5	2.8

Time: 75.0°W.

Sweep: 1.0 Mc to 20.0 Mc in 15 seconds.

Table 39

Wakkanai, Japan (45.4°N, 141.7°E)

February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		4.8	290					2.65
01		4.6	290					2.55
02		4.4	290					2.60
03		4.3	300					2.55
04		4.1	285					2.55
05		4.0	310					2.60
06		4.2	270					2.80
07		8.0	230				2.0	3.20
08	---	11.1	225					3.20
09	---	12.6	230					3.15
10	---	13.0	225					3.15
11	---	12.8	230					3.05
12	---	12.8	230					3.00
13	---	12.5	230					2.95
14		12.3	235					2.95
15		12.3	235					2.95
16		11.5	230				2.5	2.95
17		11.1	230				1.5	3.00
18		9.0	220					3.00
19		7.2	230					3.00
20		6.5	245					2.90
21		5.7	265					2.85
22		5.6	270					2.80
23		5.0	270					2.70

Time: 135.0°E.

Sweep: 1.0 Mc to 22.0 Mc in 1 minute.

Table 40

Akita, Japan (39.7°N, 140.1°E)

February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		5.2	285					2.65
01		5.0	275					2.65
02		4.9	290				(1.4)	2.60
03		4.0	290				(1.4)	2.60
04		4.3	280				(1.4)	2.55
05		4.3	300					2.50
06		4.6	275					2.80
07		8.4	240				2.0	3.15
08	---	11.5	240					3.20
09	(240)	12.6	235					3.15
10	(240)	13.4	230					3.10
11	245	13.0	225					3.05
12	245	13.4	225					2.95
13	(240)	12.7	230					2.95
14	245	12.4	240					2.90
15	(245)	12.0	245					2.90
16	---	11.5	240				3.0	2.95
17		11.0	240				(2.8)	3.00
18		9.8	235				(1.0)	2.95
19		7.8	235					2.95
20		7.1	250					2.90
21		6.2	260					2.85
22		5.8	250					2.85
23		5.6	275					2.70

Time: 135.0°E.

Sweep: 0.85 Mc to 22.0 Mc in 2 minutes.

Table 41

Tokyo, Japan (35.7°N, 139.5°E)

February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		5.6	275					2.80
01		5.2	265					2.75
02		5.0	280					2.65
03		4.8	285					2.70
04		4.5	285					2.55
05		4.5	325					2.55
06		5.0	285					2.80
07		8.9	250			2.20		3.15
08		11.9	245			2.90		3.15
09	(250)	12.9	240			3.25		3.05
10	250	13.8	235			3.45		2.90
11	250	13.9	230			3.70		2.85
12	250	13.6	235			3.75		2.80
13	250	13.2	240	---		3.70		2.80
14	(265)	13.0	250	---		3.65		2.75
15	(265)	12.8	250			3.35		2.80
16	---	12.0	250			2.75	3.2	2.85
17	---	11.5	250			2.5	2.5	2.95
18		10.4	250			(2.4)	2.90	2.90
19		8.5	250			(1.0)	2.85	2.85
20		7.8	255					2.05
21		7.1	255				1.8	2.80
22		6.5	255					2.85
23		6.2	260					2.80

Time: 135.0°E.

Sweep: 1.0 Mc to 17.2 Mc in 2 minutes.

Table 42

Yamagawa, Japan (31.2°N, 130.6°E)

February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		7.3	250					2.80
01		6.6	250					2.80
02		6.0	250					2.80
03		5.0	265					2.80
04		4.6	250					2.55
05		4.5	300					2.50
06		4.4	300				1.5	2.70
07		6.4	270				(1.7)	2.95
08	---	10.6	245					3.15
09	(245)	12.7	245				3.3	3.10
10	250	13.8	240				3.8	2.95
11	250	>13.8	240				4.1	2.90
12	250	(14.2)	240				3.9	(2.80)
13	250	(14.1)	240				4.0	(2.75)
14	250	>13.8	240				4.0	2.70
15	250	13.8	240				4.0	2.75
16	<260	13.2	250				3.9	2.75
17	---	12.8	250				(3.3)	2.80
18		12.0	250				(3.0)	2.90
19		11.3	245				(2.6)	2.90
20		10.2	245				(2.6)	2.85
21		9.0	245				(1.7)	2.05
22		9.4	245				(1.8)	2.80
23		8.5	250				(1.7)	2.00

Time: 135.0°E.

Sweep: 1.0 Mc to 22.0 Mc in 1 minute.

Table 43

Formosa, China (25.0°N, 121.5°E)							
February 1957							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs (M3000)F2
00	240	(11.9)					(2.9)
01	260	9.9					2.8
02	260	8.7					(2.3) 2.8
03	240	8.4					2.8
04	250	7.3					2.8
05	260	7.0					(2.2) 2.7
06	260	7.8					(2.2) 2.9
07	260	9.3					3.0
08	240	12.0	---	---	130	2.9	3.0
09	240	13.5	240	---	120	3.4	3.0
10	---	14.8	230	---	120	3.7	2.9
11	---	16.0	230	---	120	3.9	4.2 2.8
12	---	16.4	220	---	120	4.0	4.3 2.7
13	---	16.5	230	---	120	4.0	4.6 2.7
14	---	16.2	240	---	120	3.8	4.4 2.8
15	---	16.3	240	---	120	3.5	4.1 2.75
16	---	16.2	240	---	120	3.2	4.0 2.8
17	240	15.8	240	---	---	---	3.3 2.9
18	260	15.9					3.0
19	270	16.1					3.1 2.9
20	260	>16.5					(2.8) (2.85)
21	240	>16.2					(2.6) 3.05
22	240	>14.0					3.0
23	240	13.2					2.9

Time: 120.0°E.

Sweep: 1.1 Mc to 19.5 Mc in 15 minutes, manual operation.

Table 44

Baguio, P. I. (16.4°N, 120.6°E)							
February 1957							
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs (M3000)F2
00		12.7	240				(2.4) 3.05
01		11.2	230				3.05
02		9.3	220				3.10
03		7.6	225				3.09
04		6.2	235				(1.4) 2.95
05		5.0	250				(1.5) 2.90
06		4.6	260				(1.6) 2.80
07		8.8	270		127	(2.30)	2.5
08		11.4	250		117	(3.10)	2.70
09		13.0	240		113	3.50	4.0
10		13.2	230		111	3.80	4.1
11		13.2	220		112	(4.00)	2.30
12		13.5	220		111	(4.00)	2.30
13	---	13.8	220		111	(4.00)	2.35
14	---	14.4	230		111	(3.95)	5.0
15	---	14.7	235		111	3.60	(5.4) 2.45
16		14.7	245		113	(3.25)	(5.5) 2.50
17		14.2	260		119	(2.55)	(4.2) (2.50)
18		14.2	290				(2.9) 2.40
19		>13.5	360				(2.2) (2.30)
20		(13.4)	345				(2.1) (2.45)
21		(13.5)	270				(2.2) (2.65)
22		13.4	250				(2.1) 2.80
23		13.0	240				(2.3) 2.95

Time: 120.0°E.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 45

Nairobi, Kenya (1.3°S, 36.8°E)							
February 1957*							
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs (M3000)F2
00		>11.4	220				---
01		>10.6	<230				---
02		9.7	250				(2.85)
03		>9.4	250				(2.8)
04		(8.5)	250				(2.95)
05		(6.7)	230				(3.1)
06		6.0	220				3.25
07		(7.9)	260				(2.7) (3.1)
08	---	10.6	240			3.0	3.2
09	---	11.2	(230)			3.6	3.8
10	---	(11.9)	(220)			---	(4.2) (2.6)
11	---	(12.9)	---			---	(2.55)
12	---	>13.6	---			---	(2.45)
13	---	---	---			---	---
14	---	---	---			---	---
15	400	>14.0	(200)	---		---	(2.5)
16	390	>14.0	(220)			3.8	(2.5)
17	(400)	14.0	240			3.3	2.5
18	---	---	270			---	(2.8)
19	---	---	310			2.7	---
20	---	---	360			2.4	---
21		>10.6	300				---
22		>11.2	250				---
23		>11.2	230				---

Time: 45.0°E.

Sweep: 1.0 Mc to 16.0 Mc in 7 seconds.

\*Data observed 12:40 p.m. on February 13 to February 28, inclusive.

Table 46

Talara, Peru (4.6°S, 81.3°W)							
February 1957							
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs (M3000)F2
00		>11.3	230				(4.2) (2.90)
01		>10.2	230				>3.8 3.00
02		9.3	235				(4.0) 3.15
03		8.2	230				(3.4) 3.15
04		7.1	230				(2.8) 3.15
05		5.9	230				(3.5) 3.10
06		5.4	250				2.4 3.00
07		8.4	260		121	2.20	2.90
08		(11.7)	240		115	3.10	3.3
09		>13.5	225		111	3.60	3.8
10		(14.1)	215		111	3.95	(2.50)
11		>13.0	210		112	4.10	(2.35)
12		>13.0	205	---	111	4.20	(2.30)
13		>12.8	200	---	109	4.25	---
14	---	12.6	200	---	109	4.10	---
15		>12.5	210		107	4.00	(2.25)
16		>12.5	220		107	3.60	4.0
17		12.4	235		110	3.15	3.7
18		11.8	260		119	---	4.4
19		11.6	300				(4.2) (2.30)
20		>11.5	360				>3.0 (2.20)
21		>10.8	330				>3.2
22		>11.6	260				(2.8) (2.80)
23		>11.9	230				(3.6)

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 47

Huancayo, Peru (12.0°S, 75.3°W)							
February 1957							
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs (M3000)F2
00		9.0	250				(5.4) 2.80
01		8.8	250				(6.0) 2.90
02		8.2	250				(5.4) 3.00
03		8.3	250				>5.0 3.00
04		7.4	230				(4.5) 3.10
05		6.8	230				(4.4) 3.15
06		7.7	270				2.95
07		10.6	250		115	2.65	4.2
08		12.7	230		---	---	(8.2) 2.70
09		13.6	215		---	---	(11.1) 2.40
10		13.8	210		---	---	(12.1) 2.20
11		13.0	200		---	---	(12.4) 2.15
12		>12.0	200	---	---	---	(12.3) 2.15
13		11.6	200	---	---	---	(12.2) 2.10
14		11.7	200	---	---	---	(11.8) 2.15
15		11.6	200	---	---	---	(11.6) 2.15
16		11.9	215	---	---	---	(8.4) 2.15
17		12.0	245	---	---	---	(8.2) 2.20
18		>11.4	275				>5.8 2.15
19		>11.6	340				(2.10)
20		>9.0	(385)				(2.10)
21		(9.8)	360				(2.25)
22		(9.8)	300				(2.50)
23		9.2	260				(4.2) 2.70

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 48

Johannesburg, Union of S. Africa (26.2°S, 28.0°E)							
February 1957							
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs (M3000)F2
00		6.0	260				1.6 2.8
01		5.5	260				2.0 2.8
02		4.9	<260				1.8 2.7
03		4.3	260				1.4 2.7
04		4.0	<270				1.6 2.5
05		3.9	<300				2.6
06		5.8	270				1.8 2.1
07	---	8.1	240				2.7 3.2
08	280	9.3	230	---			3.4 3.8
09	300	10.4	220	5.4			3.7 4.1
10	320	11.1	210	5.7			4.0 4.5
11	350	11.4	210	6.0			4.1 4.3
12	360	11.7	210	6.3			4.2 4.6
13	370	11.5	210	6.2			4.1 4.5
14	380	11.1	220	6.1			4.1 4.2
15	370	10.5	220	6.0			4.0 4.2
16	360	10.1	230	5.5			3.7 3.9
17	340	9.8	240	4.8			3.2 3.6
18	---	9.5	250				2.5 2.8
19		9.2	250				2.2 2.9
20		8.4	250				1.8 2.8
21		7.7	260				2.8
22		7.1	270				2.0 2.8
23		6.5	270				2.1 2.8

Time: 30.0°E.

Sweep: 1.0 Mc to 15.0 Mc in 7 seconds.



Table 49

Watheroo, W. Australia (30.3°S, 115.9°E)

February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		6.5	260				2.5	2.80
01		6.3	260				2.3	2.75
02		6.1	260				1.9	2.75
03		(5.7)	280				1.3	2.70
04		5.6	300					2.60
05		(5.1)	300				1.4	2.60
06		(5.7)	270		110	1.80		2.85
07		6.5	230		100	2.65	2.7	2.95
08	(350)	7.1	220	4.9	100	3.20	3.6	2.90
09	390	8.0	210	5.2	100	3.65	4.0	2.85
10	350	9.1	210	5.6	100	3.85	4.2	2.75
11	370	9.5	210	5.6	100	4.00	4.2	2.70
12	380	9.9	(220)	6.0	100	4.00		2.65
13	380	9.8	(210)	6.1	100	4.10		2.65
14	370	10.0	210	6.0	100	4.00		2.65
15	370	9.5	210	6.0	100	3.85	4.1	2.65
16	380	8.9	210	5.5	100	3.65	4.0	2.65
17	350	8.5	230	5.3	100	3.25	3.6	2.70
18		8.1	250		100	2.65	2.9	2.85
19		7.1	250		100	1.85		(2.80)
20		6.8	250				1.5	(2.65)
21		6.8	260					(2.70)
22		(6.8)	280				1.6	(2.60)
23		6.7	260				2.2	(2.70)

Time: 120.0°E.

Sweep: 1.0 Mc to 16.0 Mc in 1 minute 45 seconds.

Table 50

Capetown, Union of S. Africa (34.1°S, 18.3°E)

February 1957

Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		5.4	<280				1.6	2.7
01		5.0	<280				2.1	2.6
02		4.6	<300				1.6	2.7
03		4.2	<300				1.7	2.6
04		4.0	<320					2.5
05		4.0	<330					2.5
06		4.2	320					2.5
07		6.9	260				2.3	2.5
08	(270)	8.5	240				3.0	3.2
09	300	9.6	240				3.4	3.7
10	340	10.2	230	5.6			3.6	4.0
11	360	10.8	220	5.8				4.2
12	380	11.0	(220)	6.0				4.3
13	380	11.1	(230)	6.1				2.5
14	380	10.8	220	6.1				2.5
15	380	10.5	230	5.9				2.6
16	380	10.0	230	5.8			3.8	4.0
17	380	9.3	240	5.6			3.5	3.7
18		9.0	250				3.1	3.3
19		8.6	260				2.4	2.2
20		8.2	250					2.85
21		7.0	240					2.8
22		6.5	<260				1.6	2.8
23		5.7	<270					2.7

Time: 30.0°E.

Sweep: 1.0 Mc to 15.0 Mc in 7 seconds.

Table 51

Leningrad, U.S.S.R. (59.9°N, 30.7°E)

January 1957

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	340	(3.0)						---
01	350	3.0						2.4
02	330	2.8						2.7
03	350	2.8						2.6
04	320	3.1						2.7
05	300	3.2						2.8
06	280	3.2						3.0
07	270	3.2						2.7
08	240	4.6						3.0
09	220	8.6			---	E	3.1	3.1
10	220	10.4			100	2.5	3.0	3.0
11	220	11.0			100	2.6	---	---
12	220	11.4			100	2.7	---	---
13	220	11.6			100	2.6	---	---
14	220	11.5			100	2.5	---	---
15	220	11.0			(120)	E	---	---
16	220	10.4					3.1	3.1
17	220	9.4					3.3	3.3
18	220	9.6					3.0	3.0
19	240	5.6					3.1	3.1
20	250	4.2					3.0	3.0
21	300	3.2					2.8	2.8
22	320	3.2					2.8	2.8
23	320	3.2					2.8	2.8

Time: 30.0°E.

Sweep: 2.2 Mc to 16.0 Mc in 1 minute.

Table 52

Sverdlovsk, U.S.S.R. (56.7°N, 61.1°E)

January 1957

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	360	3.4						2.4
01	350	3.4						2.5
02	350	3.4						2.4
03	340	3.6						2.5
04	340	3.4						2.5
05	320	3.3						2.6
06	300	3.2						2.6
07	300	3.4						2.6
08	270	6.0						2.8
09	250	9.6			150	1.7		2.1
10	250	11.8			130	2.5		2.5
11	250	12.6			120	2.7		3.0
12	240	13.1			120	2.8		2.9
13	250	12.9			120	2.7		2.8
14	250	12.8			130	2.6		2.9
15	250	12.2			140	2.2		2.9
16	250	11.6			150	1.9		2.9
17	250	9.8						2.9
18	250	7.8						3.0
19	260	5.8						2.9
20	270	4.2						2.7
21	310	4.0						2.6
22	330	3.5						2.5
23	360	3.4						2.4

Time: 60.0°E.

Sweep: 1.5 Mc to 18.0 Mc in 10 minutes, manual operation.

Table 53

Tomsk, U.S.S.R. (56.5°N, 84.9°E)

January 1957

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	310	3.4						2.6
01	320	3.5						2.5
02	320	3.6						2.6
03	320	3.8						2.6
04	300	3.7						2.6
05	290	3.7						2.6
06	260	3.3						2.7
07	260	3.3						2.9
08	250	4.6			---	1.3		2.6
09	230	8.6			120	1.9		3.0
10	230	10.8			120	2.3		3.1
11	230	12.2			120	2.6		3.0
12	230	12.8			120	2.7		3.0
13	220	12.6			120	2.8		3.0
14	230	12.8			120	2.6		3.0
15	220	12.0			120	2.3		3.0
16	230	11.2			120	1.9		3.0
17	230	10.4			---	1.5		3.0
18	230	8.6						3.0
19	220	6.8						3.0
20	240	5.2						3.0
21	250	4.5						2.8
22	270	3.7						2.7
23	300	3.4						2.5

Time: 90.0°E.

Sweep: 1.1 Mc to 15.0 Mc in 10 minutes, manual operation.

Table 54

Moscow, U.S.S.R. (55.5°N, 37.3°E)

January 1957

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	320	3.4						2.48
01	300	3.4						2.46
02	300	3.5						2.46
03	300	3.3						2.54
04	290	3.3						2.62
05	270	3.3			---	---		2.67
06	250	3.2			---	E		2.74
07	250	4.3			---	1.0		2.76
08	240	8.0			120	2.0		2.99
09	240	10.7			110	2.3		3.10
10	235	12.0			120	2.6		3.02
11	240	12.8			120	2.8		3.02
12	240	13.0			120	2.8		2.95
13	240	12.9			130	2.7		2.96
14	240	12.5			120	2.5		2.96
15	230	11.7			120	2.0		2.98
16	230	10.7			130	1.7		2.98
17	230	8.9			---	---		2.98
18	230	6.8			---	---		3.01
19	230	5.0						2.84
20	260	4.0						2.72
21	280	3.8						2.60
22	310	3.6						2.51
23	310	3.7						2.50

Time: 30.0°E.

Sweep: 0.5 Mc to 20.0 Mc in 10 to 30 seconds.

Table 55

Irkutsk, U.S.S.R. (52.5°N, 104.0°E)								January 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	340	(3.6)						2.6
01	340	(3.7)						2.6
02	320	(3.8)						2.6
03	300	(3.8)						2.7
04	280	(4.0)						2.8
05	260	(3.9)						2.8
06	270	(3.5)						2.8
07	260	3.4						2.8
08	230	(6.4)			---	(1.8)		3.1
09	240	9.8			110	2.4		3.2
10	230	11.8			110	2.6		3.3
11	230	12.0			110	3.1		3.1
12	230	12.0			110	3.0		3.0
13	230	11.7			(110)	3.0		3.0
14	240	11.6			110	2.8		3.0
15	230	11.4			110	2.6		3.1
16	230	10.4			110	2.0		3.0
17	240	9.9						3.0
18	230	8.4						3.1
19	230	(7.2)						2.9
20	240	(5.0)						2.7
21	260	(4.0)						2.8
22	290	(3.6)						2.8
23	300	3.4						2.8

Time: 105.0°E.

Sweep: 1.8 Mc to 16.0 Mc in 1 minute.

Table 56

Rostov-on-Don, U.S.S.R. (47.2°N, 39.7°E)								January 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	340	4.2						2.5
01	340	4.2						2.5
02	330	4.1						2.5
03	320	4.1						2.6
04	300	4.1						2.6
05	300	3.8						2.7
06	280	3.7						2.7
07	270	3.8						2.8
08	240	6.5			---	E		3.0
09	230	(9.6)			(160)	2.4		(3.0)
10	240	(9.4)			120	2.9		---
11	240	(9.3)			120	3.2		---
12	240	(9.6)			120	3.3		---
13	240	(9.6)			120	3.3		---
14	240	(9.6)			120	3.3		---
15	240	(9.4)			120	2.9		---
16	240	(9.5)			120	2.6		---
17	230	(9.2)			120	E		(3.1)
18	240	(9.0)						3.0
19	240	7.0						3.0
20	240	5.7						2.9
21	280	4.3						2.7
22	320	4.6						2.5
23	340	4.0						2.5

Time: 45.0°E.

Sweep: 1.6 Mc to 10.0 Mc in 10 minutes, manual operation.

Table 57

Wakkanai, Japan (45.4°N, 141.7°E)								January 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		3.9	320					2.55
01		3.8	310					2.60
02		3.6	305					2.60
03		3.6	280					2.60
04		3.5	280					2.60
05		3.5	280					2.65
06		3.2	260					2.80
07		5.8	240					3.00
08		8.9	220				2.3	3.20
09		11.0	225				3.2	3.10
10		12.1	235				3.5	3.05
11		12.3	235				3.5	3.05
12		11.3	230				3.6	3.00
13		11.0	230				3.5	2.90
14		10.5	230				3.5	2.90
15		10.0	235				2.9	3.00
16		8.7	225				2.2	3.00
17		7.8	225				(1.6)	2.90
18		7.0	240					3.00
19		5.8	230				1.6	3.00
20		4.2	250				(1.7)	2.85
21		3.8	285					2.60
22		3.8	320					2.60
23		3.8	310					2.60

Time: 135.0°E.

Sweep: 1.0 Mc to 22.0 Mc in 1 minute.

Table 58

Alma-Ata, U.S.S.R. (43.2°N, 76.9°E)								January 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	320	3.7						2.6
01	320	3.8						2.6
02	320	3.8						2.7
03	300	3.8						2.7
04	300	3.8						2.7
05	280	3.6						2.7
06	250	3.5			---	E		2.8
07	250	5.0			100	1.2		2.8
08	230	8.8			100	2.2		3.1
09	220	10.6			100	2.7		3.1
10	230	12.1			100	3.2		3.0
11	240	12.5			100	3.6		3.0
12	230	11.9			100	3.6		3.0
13	230	11.6			100	3.6		2.9
14	240	11.2			100	3.4		2.9
15	240	11.0			100	3.1		2.9
16	230	10.2			100	2.6		2.9
17	230	9.4			100	1.7		2.9
18	220	8.2			100	1.2		3.0
19	220	7.0						3.1
20	220	4.8						3.1
21	260	4.0						2.8
22	300	3.6						2.6
23	320	3.6						2.6

Time: 75.0°E.

Sweep: 1.6 Mc to 17.0 Mc in 10 to 15 minutes, manual operation.

Table 59

Akita, Japan (39.7°N, 140.1°E)								January 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		4.0	310					2.55
01		4.0	310					2.55
02		4.0	300				(1.4)	2.55
03		3.9	290				1.1	2.60
04		3.6	280					2.55
05		3.5	300					2.55
06		3.7	290					2.80
07		6.6	250					3.05
08		9.7	235					3.20
09		10.9	240					3.05
10		11.9	240					3.00
11		(250)	12.0	245				2.95
12		---	11.6	245				2.85
13		(250)	11.0	240				3.5
14		---	10.5	245				3.8
15			10.4	245				3.4
16			9.5	240				2.4
17			7.9	240				1.7
18			7.5	245				2.90
19			6.5	245				2.90
20			5.0	245				2.85
21			4.2	255				2.65
22			4.2	320				2.60
23			4.2	320				2.55

Time: 135.0°E.

Sweep: 0.85 Mc to 22.0 Mc in 2 minutes.

Table 60

Ashkhabad, U.S.S.R. (37.9°N, 58.3°E)								January 1957
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	310	4.2						2.5
01	310	4.2						2.6
02	300	4.2						2.6
03	290	4.1						2.7
04	280	4.0						2.8
05	280	3.8			---	1.1		2.7
06	300	3.6			---	1.2		2.8
07	270	5.3			---	1.3		2.8
08	240	8.7			130	2.2		3.1
09	240	10.2			120	2.9		3.2
10	240	11.2	240	6.0	110	3.3		3.0
11	240	11.8	230	6.0	110	3.6		2.9
12	250	11.6	250	6.4	110	3.6		2.8
13	250	11.4	230	6.2	110	3.6		2.8
14	300	11.3	240	6.2	110	3.5		2.7
15	270	11.4	240	5.9	110	3.2		2.8
16	240	11.0			120	2.8		2.9
17	240	9.8			130	2.3		2.8
18	240	8.9			---	1.4		2.9
19	240	7.7						3.1
20	240	6.1						2.9
21	250	4.3						2.7
22	300	4.2						2.6
23	320	4.3						2.6

Time: 60.0°E.

Sweep: 1.0 Mc to 15.0 Mc in 15 minutes, manual operation.

Table 61

Huancayo, Peru (12.0°S, 75.3°W)								
January 1957								
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00	(9.0)	390					>4.6	(2.35)
01	(8.3)	370					(3.5)	(2.40)
02	(8.0)	300					(3.4)	(2.75)
03	7.9	270					(3.2)	2.95
04	7.8	240					(3.8)	3.10
05	5.8	230					(4.2)	3.10
06	7.7	280				2.00		2.85
07	10.6	250			115	3.00	5.2	2.80
08	12.7	235			112	3.60	(6.8)	2.65
09	---	13.5	225		---	(3.70)	(0.2)	2.50
10	---	13.6	220		---	---	(11.3)	2.35
11	---	13.7	210		---	---	(11.6)	2.20
12	---	14.0	210	(6.7)	---	---	(11.9)	2.10
13	---	14.1	200	(6.6)	---	---	(11.7)	2.05
14	(490)	13.7	200	(6.4)	---	---	(11.1)	2.00
15	(530)	14.0	205	6.2	---	---	(11.0)	2.05
16	---	>12.8	225		---	---	(8.6)	1.95
17	---	>12.5	250		---	---	(8.3)	2.10
18	---	>13.1	280		---	2.35	(6.2)	(2.20)
19	---	>11.2	335					2.20
20	---	>11.2	400					2.05
21	---	(10.5)	(420)					(2.10)
22	---	>9.7	430					(2.30)
23	---	(9.3)	(405)					(2.20)

Time: 75.0°W.  
Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 62

Lulea, Sweden (65.6°N, 22.1°E)								
June 1956								
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(295)	---	---	---	---	---		2.5
01	---	---	---	---	---	---		2.7
02	---	---	---	---	---	---	1.8	2.7
03	(365)	---	245	3.5	---	---	2.2	2.8
04	390	(5.0)	240	3.8	---	---	2.5	2.0
05	430	5.7	225	4.0	---	---	2.0	3.0
06	395	6.0	225	4.4	---	---	3.4	---
07	(400)	6.0	---	4.5	---	---	---	3.5
08	386	6.4	---	4.7	---	---	---	3.0
09	400	6.6	---	5.0	---	---	---	---
10	405	6.9	220	5.0	---	---	3.9	---
11	390	6.6	210	5.0	---	---	---	3.1
12	405	6.4	210	5.0	---	---	3.7	---
13	385	6.4	210	5.0	---	---	3.6	---
14	(425)	6.2	210	4.9	---	---	---	3.0
15	415	6.4	---	4.8	---	---	---	3.0
16	(370)	6.0	225	4.6	---	---	3.6	---
17	---	6.0	---	4.3	---	---	---	3.1
18	---	6.0	---	4.0	---	---	---	3.2
19	---	---	250	3.7	---	---	2.4	3.0
20	---	---	260	3.7	---	---	2.2	2.4
21	---	---	260	---	---	---	1.8	2.0
22	---	---	280	---	---	---	1.6	2.0
23	(305)	---	---	---	---	---	---	2.4

Time: 15.0°E.  
Sweep: 1.5 Mc to 10.0 Mc in 9 minutes, automatic operation.

Table 63

Delhi, India (28.6°N, 77.1°E)								
June 1956								
Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	360	8.2						2.80
01	340	8.2						2.90
02	---	---						---
03	---	---						---
04	320	7.0						3.00
05	320	7.2						3.00
06	310	8.2						3.05
07	280	9.2						3.25
08	300	9.0						3.10
09	320	9.4						3.00
10	380	9.8						2.70
11	400	10.8						2.60
12	380	11.5						2.70
13	370	11.8						2.75
14	360	11.9						2.80
15	360	12.2						2.80
16	360	12.3						2.80
17	320	11.4						3.00
18	320	10.9						3.00
19	320	9.8						3.00
20	320	9.1						3.00
21	360	8.5						2.80
22	360	8.6						2.80
23	360	8.4						2.80

Time: 75.0°E.  
Sweep: 1.5 Mc to 18.0 Mc in 5 minutes, manual operation.  
\*Height at 0.83 foF2.

Table 65

Bombay, India (19.0°N, 73.0°E)								
June 1956								
Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05								
06	360	7.2						2.80
07	360	8.4						2.80
08:30	390	9.6						2.65
09	420	10.1						2.55
10	450	10.5						2.45
11	500	11.6						2.30
12	540	12.2						2.15
13	540	12.4						2.15
14	540	12.6						2.15
15	510	12.1						2.25
16	480	11.7						2.30
17	480	11.3						2.30
18	480	10.9						2.30
19	420	10.2						2.55
20	(360)	(8.9)						(2.80)
21	360	8.3						2.80
22	360	7.2						2.80
23								

Time: 75.0°E.  
Sweep: 1.5 Mc to 18.0 Mc in 5 minutes, manual operation.  
\*Height at 0.83 foF2.

Table 64

Ahmedabad, India (23.0°N, 72.6°E)								
June 1956								
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	325	7.2					4.0	2.62
01	310	7.0					3.7	2.64
02	300	6.8					3.3	2.64
03	300	6.7					3.2	2.60
04	300	6.4					3.2	2.70
05	295	6.2					3.0	2.80
06	255	7.0	255	---	115	2.0	3.2	2.95
07	260	8.6	230	4.3	110	2.8	4.0	3.05
08	270	9.0	225	4.7	107	3.2	4.5	3.05
09	300	8.9	215	5.0	105	3.5	5.5	2.81
10	350	9.3	235	5.5	105	3.7	5.5	2.66
11	400	10.5	230	5.5	105	3.8	5.4	2.60
12	410	12.0	250	5.7	105	3.9	5.6	(2.69)
13	400	12.5	250	5.7	105	3.9	5.0	2.65
14	395	13.0	250	5.5	105	3.8	4.2	2.67
15	360	14.0	235	5.4	105	3.7	4.3	2.76
16	340	13.9	230	5.2	105	3.4	5.8	2.80
17	310	13.4	240	4.7	110	3.0	5.0	2.81
18	290	12.5	250	4.3	120	2.3	4.2	2.81
19	270	11.5					3.8	2.80
20	280	9.2					4.0	2.79
21	300	7.6					3.2	2.64
22	330	7.2					3.2	2.52
23	340	7.2					3.8	2.54

Time: 75.0°E.  
Sweep: 0.6 Mc to 25.0 Mc in 5 minutes, automatic operation.

Table 66

Madras, India (13.0°N, 80.2°E)								
June 1956								
Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05								
06	310	8.1						3.05
07	340	9.6						2.90
08	400	10.5						2.60
09	440	10.6						2.50
10	480	10.7						2.30
11	520	10.9						2.20
12	490	10.8						2.25
13	520	11.2						2.20
14	500	11.3						2.25
15	480	11.6						2.30
16	470	12.0						2.35
17	440	12.5						2.50
18	440	12.2						2.50
19	440	11.7						2.50
20	480	10.9						2.30
21	440	>10.0						2.50
22	---	---						---
23	---	---						---

Time: 75.0°E.  
Sweep: 1.5 Mc to 18.0 Mc in 5 minutes, manual operation.  
\*Height at 0.83 foF2.

Table 67

Tiruchy, India (10.8°N, 78.8°E)							
June 1956							
Time	*	foF2	h'F1	foF1	h'E	foE	fEs (M3000)F2
00							
01							
02							
03							
04							
05							
06	320	7.8					3.00
07	360	9.6					2.80
08	400	10.4					2.60
09	480	10.8					2.30
10	480	11.0					2.30
11	480	10.8					2.30
12	500	10.6					2.25
13	520	10.7					2.20
14	520	10.8					2.20
15	520	10.8					2.20
16	480	10.6					2.30
17	480	10.3					2.30
18	480	10.2					2.30
19	440	10.6					2.50
20	---	---					---
21:30	(440)	(9.4)					(2.50)
22	(400)	(8.9)					(2.60)
23							

Time: 75.0°E.

Sweep: 1.5 Mc to 18.0 Mc in 5 minutes, manual operation.

\*Height at 0.83 foF2.

Table 68

Kodaikanal, India (10.2°N, 77.5°E)							
June 1956							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs (M3000)F2
00	320	7.6					2.70
01	325	6.8					2.80
02	320	6.1					2.80
03	300	5.8					2.80
04	260	5.0					3.10
05	255	4.0					3.20
06	270	7.1					2.95
07	260	9.4	245	---	---	---	2.90
08	---	10.5	235	---	---	---	6.0
09	300	10.6	220	---	---	---	8.0
10	(335)	10.6	220	---	---	---	9.0
11	(330)	10.3	215	---	---	---	9.9
12	(400)	10.2	210	---	---	---	10.0
13	(400)	10.2	220	---	---	---	10.0
14	390	10.6	220	---	---	---	10.0
15	---	10.9	230	---	---	---	9.9
16	---	11.6	240	---	---	---	8.0
17	260	11.7	---	---	120	---	7.0
18	290	11.8					4.8
19	330	11.5					2.50
20	365	10.4					2.45
21	395	9.2					2.50
22	370	9.0					2.50
23	340	8.1					2.60

Time: 75.0°E.

Sweep: 1.0 Mc to 25.0 Mc in 27 seconds.

Table 69

Poitiers, France (46.6°N, 0.3°E)							
February 1956							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs (M3000)F2
00	275	4.0					2.0 (2.75)
01	275	4.2					(2.85)
02	275	3.9					(2.75)
03	275	4.0					2.80
04	275	3.8					2.80
05	255	3.6					2.75
06	255	3.2					2.90
07	235	4.8	170	1.9	---	---	3.20
08	225	6.7	170	2.7	110	2.4	---
09	230	8.0	225	3.7	110	2.8	---
10	230	(8.5)	225	4.2	105	3.1	---
11	250	9.2	220	4.5	105	3.2	---
12	250	(9.3)	220	4.6	110	3.3	---
13	250	(8.8)	225	4.4	105	3.4	---
14	250	(9.3)	225	4.4	110	3.2	---
15	245	(9.3)	230	4.0	110	3.0	---
16	230	8.5	235	3.3	115	2.5	2.8
17	225	8.5	225	2.0	---	1.7	2.5
18	220	(6.7)	---	---	---	E	2.3
19	230	5.1					2.2 (3.30)
20	240	4.4					1.9
21	250	4.5					2.0 (2.95)
22	275	4.2					---
23	295	4.4					2.75

Time: 0.0°.

Sweep: 1.6 Mc to 16.8 Mc in 1 minute.

Table 70

Casablanca, Morocco (33.6°N, 7.6°W)							
February 1956							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs (M3000)F2
00	280	5.10					2.2 (2.90)
01	280	4.80					2.95
02	270	>4.50					2.95
03	270	4.75					3.00
04	250	5.10					3.10
05	245	4.00					3.10
06	275	3.70					2.95
07	270	4.30					3.00
08	240	7.35	250	---	130	2.10	3.50
09	240	8.40	235	(3.60)	115	2.80	3.45
10	250	>9.55	230	(4.50)	115	3.20	3.30
11	255	9.70	230	(4.60)	115	3.40	3.35
12	270	10.00	215	(5.00)	110	3.45	3.30
13	270	9.40	220	(4.80)	115	3.50	3.20
14	275	9.40	230	(4.90)	120	3.45	3.25
15	260	9.00	235	(4.75)	115	3.30	3.25
16	255	8.60	235	(4.30)	120	3.10	3.20
17	250	8.70	245	---	125	2.50	2.9
18	240	8.50			---	---	2.6
19	235	>6.60			---	---	2.2
20	250	5.70					2.0
21	265	6.40					2.1 (3.00)
22	265	>4.50					2.1
23	280	>4.50					2.0

Time: 0.0°.

Sweep: 1.6 Mc to 16.0 Mc in 1 minute 15 seconds.

Table 71

Poitiers, France (46.6°N, 0.3°E)							
January 1956							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs (M3000)F2
00	<280	3.6					2.0 2.95
01	<290	3.6					2.0 2.85
02	295	3.4					2.75
03	<290	3.2					2.85
04	280	2.8					2.85
05	260	2.8					2.75
06	260	2.7					2.85
07	245	3.2					2.95
08	220	5.8	185	2.1	---	E	2.2 (3.30)
09	220	7.6	200	2.7	120	2.3	---
10	225	(8.0)	220	3.6	110	2.6	---
11	230	(8.6)	215	4.1	110	2.8	---
12	230	8.6	210	4.2	110	2.9	(3.55)
13	240	8.2	220	4.0	110	2.9	---
14	230	(8.6)	225	3.6	110	2.7	---
15	225	7.9	230	(3.1)	115	2.4	(3.50)
16	215	7.0	215	2.3	---	1.9	2.2
17	215	(6.7)	---	(1.6)	---	E	1.7
18	220	(5.1)					3.0 (3.40)
19	230	4.4					2.3
20	250	3.6					2.5
21	<280	3.4					2.3 (2.80)
22	<285	3.5					2.4
23	290	3.6					2.90

Time: 0.0°.

Sweep: 1.6 Mc to 16.8 Mc in 1 minute.

Table 72

Casablanca, Morocco (33.6°N, 7.6°W)							
January 1956							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs (M3000)F2
00	270	4.20					2.2 3.00
01	280	3.90					2.2 2.90
02	290	3.80					2.90
03	285	3.50					2.95
04	285	3.50					3.00
05	280	3.15					2.90
06	295	2.90					2.90
07	260	3.50					3.00
08	225	7.10	240	---	---	E	1.9 3.60
09	225	7.80	230	3.30	120	2.50	3.2 3.55
10	230	8.70	225	(4.40)	110	2.90	3.5 3.40
11	245	9.90	220	(4.55)	110	3.15	3.6 3.45
12	250	9.10	215	(4.80)	110	3.30	3.5 3.40
13	250	8.70	210	(4.70)	115	3.30	3.5 3.40
14	250	8.40	220	(4.60)	115	3.20	3.6 3.30
15	255	9.00	230	(4.50)	115	3.00	3.5 3.25
16	240	8.70	240	(3.90)	120	2.70	3.4 3.40
17	230	7.65	240	---	125	2.10	2.4 3.40
18	225	6.60					2.2 3.30
19	245	5.15					2.1 (3.10)
20	240	>5.00					2.3 3.20
21	250	4.30					2.6 2.90
22	285	4.00					2.7
23	290	4.20					2.85

Time: 0.0°.

Sweep: 1.6 Mc to 16.0 Mc in 1 minute 15 seconds.



TABLE 73  
**IONOSPHERIC DATA**

foF2, 0.1 Mc, June 1957  
Station WASHINGTON

Lat. 38° 7N

Long. 77° 1W

Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec.

75.0W Mean Time

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
01	69	64	60	55	50 <sup>F</sup>	55	68	75 <sup>V</sup>	83	84	86	90	90	92	91	90	90	86	83	88	87	85	84	80	
02	76	72	73	72	65	71	86	93 <sup>H</sup>	97	100	103	106	103	103	99	98	96	95	95	95	92	88	88	84	
03	80	68	68	66	62	66	72	74 <sup>H</sup>	70	76	71	70	70	68	69	70	70	70	68	70	69	69	71 <sup>F</sup>	63	
04	63	65	57 <sup>U S</sup>	47	50 <sup>U S</sup>	45	49	49 <sup>J</sup>	55	56	57			63	66	69	71	80	80	83	92	79 <sup>U S</sup>	77 <sup>U S</sup>	75	
05	66	65	61	52	42 <sup>F</sup>	45	52	53	57	57	59	59	65	65	69	69	68	67 <sup>U S</sup>	69	67	69	76	72 <sup>U S</sup>	67	
06	57	50 <sup>F U S</sup>	45	40	37	43	47	45	55 <sup>F E G</sup>	48	54	53 <sup>E G U R</sup>	55	56	58	60	59 <sup>U S</sup>	63	64	65	64	70	65 <sup>U S</sup>	64	
07	63	58	52	47	45	49	55	59	62	62	64	65	67	64	65	68	72	71	73	72	72	72	67 <sup>F</sup>	67	
08	64	59	56	54	48	53	64	66	63	65	65	65	63	65	65	66	64	68	68	67	69	70	69 <sup>F</sup>	69	
09	63	62 <sup>F</sup>	62 <sup>F</sup>	60 <sup>F</sup>	57 <sup>F</sup>	63	70	75	78	82	88	90	85	85	80	82	80	80	80	80	83	78 <sup>F</sup>	74 <sup>F</sup>	73	
10	71 <sup>F U F</sup>	67 <sup>F</sup>	66 <sup>F</sup>	63 <sup>F</sup>	64	67	78	90	92	89	96	97	94	90	91	89	88	88	89	89	89	79	84	82	
11	77	74	71	70	65 <sup>U S</sup>	65	70	79	87	90	94	97	97	95	93	90	89	89	87	89	91	86	85	84	
12	77	76	75	70	64	62	65 <sup>J C</sup>	84	75 <sup>U S</sup>	83	87	83	84	84	82	80	80	81 <sup>U R</sup>	80	80	83	79	78		
13	78	72	65	58	55	57	59 <sup>U S</sup>	63	63	69	74	71 <sup>U S</sup>	73	72	75	75	78	78	79	77	78 <sup>U S</sup>	79 <sup>U S</sup>	73 <sup>U S</sup>	74	
14	72	70	60	58	58	56	60	64	69	75	74	75	76	76	77	75	77	78	75	76	72	77	75	73	
15	72	69	64	63	58	58	67	76	75	78	72	71	73	68	69	68	67 <sup>U S</sup>	67	67	70	72	77	75	72	
16	71	65	59	58	57	60	65	67	69	70	70	71	71	72	74	72	74 <sup>U S</sup>	73	74 <sup>U A</sup>	72	74	76	74	70	
17	69	65	59	62	61	61	65	65	67	69	69	69	68	69	69	69	72	72	74	72	73	76	71	70	
18	63	58 <sup>F</sup>	59 <sup>U S</sup>	47	48	49	53	54	56	56 <sup>F</sup>	59	61	61	65	66	68	69	72	70	70	74 <sup>F</sup>	76 <sup>F</sup>	76	69	
19	67	59	59	53	47	48	49	56	55	60	63	64	64	66	69	70	70	69	70	69	68	73	77	78	
20	74	66	63	62	55	57	62	61	63	64	65	64	63	63	63	67	68	69	68	72	67	67	65	65	
21	62	60	49	46	43	47	54	56	59	66	65	66	69	71	70	69	69	67	71	70	70	72	71	69	
22	63 <sup>U S</sup>	60 <sup>F</sup>	56 <sup>F</sup>	52 <sup>F</sup>	44 <sup>F</sup>	47 <sup>F</sup>	56	63	59	58	61	56	58	59	60	62	63	63	64	62	64	66	67	65	
23	62	58 <sup>F</sup>	54 <sup>F</sup>	48 <sup>F</sup>	45 <sup>F</sup>	50	62	67	70	70	72	73	75	76	73	74	77	76	78	79	76	72	72	69	
24	67	66	64	50	45	46	51	52	56	59	59	63	67	67	68	70	69	71	73	72	73	76	75	72	
25	70	63	63	55	53	49	52	57	68	71	75	80	77	78	73	77	76	87	86	90	86	86	70 <sup>U F</sup>	59	
26	42 <sup>U F</sup>	36 <sup>F</sup>	31 <sup>U F</sup>	25 <sup>U F</sup>	32 <sup>U F</sup>	35	38	44	45	47	48	52	52	61	58	60	61	62	65	66	68	72	64	64	
27	60	57	52	47	43	45	55	57	54	58	59	63 <sup>H</sup>	66	70	71	72	73	76	75	73	77	79	75 <sup>F U F</sup>	68	
28	68	64 <sup>F</sup>	63 <sup>F</sup>	58 <sup>F</sup>	54 <sup>F</sup>	58	70	85	86	89	95	98	94	92	89	89	93	94	89	85	85	84	77 <sup>F</sup>	76	
29	74	66	61	58	54	52	59	63	68	69	72	75	70	73	72	71	73	73	75	78	78	77	76	74	
30	70	59 <sup>F</sup>	52 <sup>F</sup>	58 <sup>F</sup>	48 <sup>F</sup>	49	46	47	47 <sup>U F</sup>	47 <sup>E G</sup>	47 <sup>E G</sup>	47 <sup>E G</sup>	47 <sup>E G</sup>	47 <sup>E G</sup>	47 <sup>E G</sup>	50	63	80	55 <sup>U F</sup>	32 <sup>U F</sup>	29 <sup>F U S</sup>	27 <sup>U S</sup>	29 <sup>U S</sup>		
MEQ	68	64	60	56	52	52	60	63	65	69	70	70	70	70	70	70	72	72	74	72	74	76	74	70	
NO	30	30	30	30	30	30	30	29	30	30	30	29	29	30	30	30	30	30	29	30	30	30	30	29	
RAN																									

TABLE 74  
**IONOSPHERIC DATA**

foF1, 0.1 Mc, June 1957  
 Station WASHINGTON

Lat. 38° 7N

Long. 77° 1W

Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec.

75.0W Mean Time

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01							L	L		L	580	U R	U A	H		H	H	L	L					
02								L	A	L	670	A	H	H		A		L	L					
03								L			540	U H	540	540	530	510	520	U L	L	A				
04							L	U R				A	A	U R	H				L					
05								L				A	H	U R	U R	H	A	H	L	L				
06								L			460	490	500	500	530	530	530	500	480					
07							400	450	470	480	490	530	520	520	520	500	490	450	420	L				
08								H					U R			H	H		L	L				
09							420	480	520	520	530	560	550	540	550	530	530	490						
10								L	U R	H	U R	U R	U R	U R		530	520	H	L	L				
11								L			490	560	530	490	550	540	530	510	470					
12							A	L				A		R		H	H	L	L	A				
13								L	L	L	H	H	H	H	590	600	560	550						
14											600	640	590	630	600	630	560		L	L	L			
15							L	L	H	H		H	H	H		H		A	A					
16									500	620	610	620	640	580	620	640	550	540						
17									U H	L	H		U R				H	H	L					
18								H	H	U H	H	H	H	H	U S	H	H		L	L				
19							470	500	530	530	580	600	600	570	590	580	530	510						
20									U R	U R	550	570	570	570	550	570	550	550	H	L	L			
21							450	490	530	550	550	570	570	570	550	570	550	550						
22								L	L	U R	U H		U R		U R	H	U R		L					
23									550	610	560	560	550	550	540	550	500	550	470					
24							L		H	H	H	H	A	U R	H	U H	A		A	A				
25								L	490	530	550	560	570	590	580	570	580							
26								L	L	U H		U A	U R	U R	H		H	L	L					
27									540	550		560	550	570	560	530	520	500						
28											U R		U R		U R	U S								
29							L	450	480	500	520	550	550	560		530	510	530	450					
30								L		F	H			A		H	H		U L	L				
31									460	480	520	520	550	560		550	550	520	500	440				
32								L		H	H			A	H	H		L	L					
33									500	510	540	520	540	550		540	530	480						
34																								
35									500	510	540	520	540	550		540	530	480						
36																								
37									U R	U H		H	U R		U R		U R	H	H	L				
38									450	490	550	530	550	560	540	530	530	490	470					
39																								
40																								
41																								
42																								
43																								
44																								
45																								
46																								
47																								
48																								
49																								
50																								
MEQ							400	460	510	520	530	550	550	560	550	540	530	490	450					
NO							10	20	27	24	28	26	28	27	30	30	29	23	7					
RAN																								

TABLE 75  
**IONOSPHERIC DATA**

foE, 0.05 Mc, June 1957  
 Station WASHINGTON

Lat. 38° 7N

Long. 77° 1W

Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec.

75.0W Mean Time

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01						U R 250	315	I B 360	I A 390	U R 390	I A 390		R	A	390	I A 385	I A 360	H 330	U R 275	R				
02					S	260	315	340	370	395	400	400	U R 395	365	U A 360	I A 330	I A 320	H 275	A					
03					U R 185	I R 255	300	330	360	370	365	390	390	U H 390	U R 390	I R 360	320	265	A					
04					A	250	315	335	355	365			A	A	A	370	350	325	270	210				
05					U R 185	H 250	300	335	375	380			A	A	A	A	345	325	265	200				
06					170	H 260	310		R	A	A	400	U R 400	U A 395	380	I R 360	U A 335	I R 310	I R 275	190				
07					A	250	310	350	H 380	U R 400	410	400	U R 400	400	390	375	340	320	265	185				
08					R	250	315	345	365	380	385	400	400	400	400	385	365	330	280	A				
09						H 160	R 250	A	A	A		415	H 420	U S 420	400	370	365	A	B	A				
10					B	A	H 315		I R 345	360	390	400	I R 415	I R 405	U R 395	U R 380		U A 355	A 325	A				
11					A	250	300	335	R				400	415	400	400	365	340	285	A				
12					U H 180	C	C	A	U A 380		R	A	A	I R 400	400	I R 395	H 375	H 330	U R 275	185				
13					S	A	U R 320	H 340	I A 380	U R 390	U R 390	I A 405	H 400	U R 410	400	370	335	285	A					
14					S	260	335	360	385	400	410	405	U R 405	A	S		370	330	280	S				
15					S	A	H 335		U R 375	390				R		415	395	385	335	285	U H 200			
16					S	U S 270	H 325	U R 355	385		A	A	420	400	400	395	H 375	U R 345	U A 290	185				
17					A	250	315	360		A	A	I A 395	A	A	A	400	I R 375	H 320	280	A				
18					U R 175	260	315	350	380	395	405	400				390	360	340	290	A				
19					U R 185	R	U A 310	335	A	A	A	A	A	A		385	360	330	280	U R 200				
20					I A 170	I A 245	I A 285	330	U A 360	A	A	A	A	A	H 400	H 385	355	325	265	U R 200				
21					A	A	A	U R 350	A	A			A	A	A	A	375	330	290	220				
22					R	H 265	310	360	I A 375	390	400	400	400	400	400	380	H 355	H 320	U H 290	215				
23					H I A 180	I A 260	320	365	I A 385	400		A	A	410	405	390	I R 365	I A 330	H U A 285	A				
24					R	H 240	H 295	H 335	I R 370	A	A	A	A	A		390	I R 380	360	335	280	A			
25					B	240	310		A	A	A	390	410	410	400	370	350	U S 330	U H 280	200				
26					R	H 250	U R 305	335		A	A	400	395	400	400	385	350	330	285	A				
27					175	260	310	I A 345	370	I A 385	U R 390		A	A	A	385	375	340	U A 290	A				
28					H U H 210	285	330	A	A	A	A	A	A	H 400	H 400	H 385	A	A	290	A				
29					S	H 265	315	I A 355	U R 370	U R 395	I A 400		A	A	A		350	325	275	A				
30					R	U H 270	A	A	I A 370	A	A	A		A	A	390	A	A	B	U H 190				
MEQ						180	250	315	345	U 375	U 390	400	U 400	400	400	385	360	330	280	200				
NO						11	24	26	24	20	15	17	15	16	21	25	28	27	28	13				
RAN																								



TABLE 76  
IONOSPHERIC DATA

foEs, 0.1 Mc, June 1957

75.0W Mean Time

Station WASHINGTON

Lat. 38° 7N

Long. 77° 1W

Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec.

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
01	S	S	J	20	S	B	B	G	G				J	68	46	50	40	37	G	G	B	S	S	S	S					
02	J	30	S	J	J	J	J	J	J	40	44	45	J	68	47	43	50	J	48	46	G	30	29	42	28	18				
03	S	S	S	B	B	B	B						G	G	G	G	G				J	54	26	S	S	27				
04	S	S	B	S									J	J	J		G	G	G	G	G	S				S				
05	J	21	38	36	48			27	31	40	39	40	48	42	48	42	39	J	48	35			19	26	B	S				
06	B	S	S	S	S	S	B	G	G	G			G	G						G		B	S	B	B					
07	B	J	21	S	S	S	J	G	G	G	G	G	J	G	G		40	40	38	35	28		S	S	S	S				
08	20	20	S		J	J	J			36	37		G			G	G	44	36	40	J	39	26	19	35	J	25			
09	20	S	S	34	42	38	48	58	33	49	38	56		45	44	G		G	39	52	84	40	64	40	J	S				
10	S	S	S	S		20	24	44	37	44	49	40	G	G	G	G	39	G	G	J	40	60	22	19	32	J	S			
11	J	31	J	37	S	S								G	G	G	G	G	G	J	J	60	31	S	J	J	22			
12	J	34	B	J	J	J	G	C	C	J			G		G	G	G	G	G	32	G	S	S	S	S	S				
13	S	S	S	31	22	18	24	27					43	47	46	43	43				30	25		S	S	S	S			
14	S	S	S	S	J	27	25	25	32	38	44	44	41	43	43	76	43	41	39	34	30	21		S	S	S	B			
15	J	26	S	S	S	20	19	28	34		41	40	42	44	44		45	41	43	33	22		S	S	S	S				
16	S	S	S	S	S		19		39	40	47	47	52	57	53	62	49	84	47	70	74	72	64	21	J	S				
17	J	21	S	S	J	J	21	21	27	33	38	47	112	62	49	42	42	G	G	G	32	21	S	S	S	S				
18	S	S	S	S	S	S	G		28	49	57	39	40	44	42	41	39	G	H	G	32	76	S	J	S	S				
19	S	S	S	S	J		G							J	J			G	G	G		J	22	J	S					
20	S	S			22	34	32	41	40	42	40	46	60	45	41		G				27	40	35	22	J					
21	S	J	24	S	S	J	22	19	27	32								G		36	36	21	J	28	37	J	39			
22	S	S	S	S	S		17		28	32	44	44	40	68		41	39	39		G		23	27	33		S	S			
23	S	S	S	S	S	S	G		27	36	38	52	50	68	58		39	38	40		30	24	23	22	S	S	S			
24	S	S	S	S	S	S	G	G			40	42	44	50	41	40		41	42	39	34	40	19			S	S			
25	S	S	S	S	S	S	G	G	G		39	74	72	47		G	G	G	G	G	30	J	J	J	J	J	J			
26	S	S	S	S	S	S	G	G	G	J	62	42	43			41	G	G	G	G	35	45	J	34	23	S	J	60		
27	S	19	S	S	S		19	28	34	38	38	47	44	43	64	42	G	G			33	33	35	J	44	35	J	46		
28	S	J	26		S	S	G		31	35	40	40	42	41	44		G	G		42	35	40	60	22	J	22	J	43	46	
29	J	29	J	17	S	S							J	J	J	J		G	G											
30	S	S	S	S	S		20	28	34	37	40	52	42	43	40	44	41	40	B	B	G	S	J	S	S	S	S	S		
MEQ	U	21	U	24	30	U	31	U	22		27	33	40	42	42	44	43	42	39	37		32	26	28	U	28	U	34	U	25
NO	11	9	10	9	14	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30	29	30	19	18	14	13				
RAN																														



TABLE 77  
IONOSPHERIC DATA

fbEs, 0.1 Mc, June 1957  
Station WASHINGTON

Lat. 38° 7' N

Long. 77° 1' W

Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec.

75.0W Mean Time

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
01			18						40	43	44	44	52	43	49	40	37								
02	29		24	32	20		46	49	66	47	54	58	45	43	50	46	46		30	28	37			18	
03								33			40	39						36	33	53	19			22	
04					17	23		34	38	43	52	115	84	45	39										
05	17	22	27	27			27	31	39	39	40	48	42	40	41	39	46	35							
06									37	39				40	40	40	35	33		22					
07		17				25									40	39	37	35	28						
08		20							36	37							44	36	39	30	24		29	23	
09	18		25	42	33	40	54	33	45	38	51		45	43				37	31	47	30	32	28		
10					20	24	36	36	44	42	40					38			33	27	20	19	26		
11	25	18				20	30	35	36	39			42						41	60	20		34	18	
12	25			27	21				35	37			44						30						
13			17		18	23	27				42	45	46	42	43				30	25					
14				27	19	24	30	38	37	41	41	43	43	45	43	41	39	34	30	21					
15						18	27	34		40	40	42	43	43		40	40	35	29	22					
16						17			39	46	46	50	50	50	48	48	60	40	64	36	25	25			
17							26	33	37	45	68	52	45	41	41				29	21					
18							27	35	38	39	40	43	42	41	39		39		31	26		18			
19					20		31	31	35	38	41	40	45	57	42	40				23	17	19			
20			23					35	36	40	40	42	42	60		41		36	35		25	23	25	28	
21		20				19	27	32		38	40	41	41	40	41	39			30	27	40	46	41	20	
22							27	32	39	38	40	53		41		39	39			23	22	25			
23							27	35	38	45	45	45	50		39	36	36		25	23	21				
24									34	37	40	42	41	40		41	39	39	31	31					
25									37	51	40	46							30						
26									39	40				41					35	42	26			40	
27						19	28	33	36			42	43	42	42				32	26	17		25	25	
28							30	35	40	40	41	41	44				38	35	35	47	20			27	
29	20	27						35	41	43	46	47	47	58	44	40			34	27	39	22	34		
30							27	34	35	39	45	42	43	40	40	39	40								
MEQ																									
NO																									
RAN																									

TABLE 78  
**IONOSPHERIC DATA**

f min, O.1 Mc, June 1957

75.0W Mean Time

Station WASHINGTON

Lat. 38.7N

Long. 77.1W

Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec.

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	E S 16	E S 18	17	E S 16	22	20	18	23	38	25	28	26	26	25	34	21	23	30	16	26	E S 16	E S 16	E S 16	E S 16
02	E S 16	E S 16	E S 16	E S 16	E S 16	17	21	31	18	18	25	30	30	30	30	25	19	34	21	19	E S 16	E S 16	E S 16	E S 16
03	E S 16	E S 16	18	21	17	21	32	23	18	28	28	28	30	24	26	25	23	26	18	16	E S 17	E S 16	E S 16	E S 16
04	E S 20	E S 16	28	16	16	17	20	22	16	16	19	21	30	25	25	20	24	19	16	16	E S 16	E S 16	E S 16	E S 16
05	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	18	18	25	22	22	30	27	26	24	20	32	18	23	17	25	24	E S 16
06	22	E S 16	E S 17	E S 16	E S 16	22	18	22	17	24	22	26	30	30	25	24	19	29	20	20	22	E S 16	23	21
07	29	E S 16	E S 16	E S 16	E S 16	16	20	21	19	29	25	21	23	25	26	21	21	30	24	16	E S 16	E S 16	E S 16	E S 16
08	E S 16	E S 16	E S 21	E S 16	E S 20	16	20	21	20	27	27	28	29	25	28	25	22	25	21	16	E S 16	E S 16	E S 16	E S 16
09	E S 17	E S 16	E S 16	E S 16	E S 16	16	19	22	18	24	29	30	29	25	24	21	24	27	27	21	E S 16	E S 16	E S 16	E S 16
10	E S 16	E S 16	E S 16	E S 16	E S 16	20	26	22	21	25	25	26	30	31	30	21	21	25	22	18	E S 16	E S 16	E S 16	E S 16
11	E S 16	E S 16	E S 14	E S 16	E S 16	16	17	23	20	24	25	22	24	25	23	24	19	22	20	17	E S 16	E S 16	E S 16	E S 16
12	E S 16	29	22	E S 16	15	31	C	C	16	25	23	23	29	27	25	22	23	26	20	16	E S 16	E S 16	E S 16	E S 16
13	E S 16	E S 16	E S 16	E S 16	E S 16	16	18	20	16	21	25	24	25	26	25	25	24	23	20	16	E S 20	E S 17	E S 16	E S 23
14	E S 13	E S 16	E S 16	E S 16	E S 16	16	17	24	16	16	22	26	24	31	26	32	24	17	17	16	E S 16	E S 16	E S 16	22
15	E S 16	E S 16	E S 16	E S 19	E S 16	16	16	22	26	22	20	26	24	30	30	27	22	17	16	16	E S 16	E S 16	E S 16	E S 16
16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	16	19	19	19	27	27	24	23	25	21	23	16	16	E S 15	E S 16	E S 16	E S 16
17	E S 15	E S 16	E S 16	E S 16	E S 16	16	16	22	17	20	22	25	23	24	24	26	20	24	16	16	E S 16	E S 16	E S 16	E S 16
18	E S 20	E S 16	E S 16	E S 18	E S 16	16	16	16	16	16	20	22	22	22	25	21	17	23	16	16	E S 16	E S 16	E S 16	E S 16
19	E S 16	E S 16	E S 16	E S 16	E S 16	16	17	22	16	22	23	24	25	25	25	22	17	20	19	16	E S 16	E S 16	E S 16	E S 16
20	E S 16	E S 16	E S 16	E S 12	E S 16	16	15	16	16	19	23	27	24	22	23	22	20	18	18	16	E S 16	E S 16	E S 16	E S 16
21	E S 16	E S 16	E S 16	E S 13	E S 16	16	16	18	16	22	22	25	27	27	21	18	22	21	22	16	E S 16	E S 16	E S 16	E S 16
22	E S 16	E S 16	E S 16	E S 13	E S 16	16	17	20	17	23	22	25	26	27	24	22	22	26	18	16	E S 16	E S 16	E S 16	E S 16
23	E S 16	E S 16	E S 16	E S 16	E S 14	16	16	22	28	26	27	26	28	25	27	25	21	23	20	16	E S 16	E S 16	E S 16	E S 16
24	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	24	17	22	26	24	25	28	23	26	21	24	24	16	E S 16	E S 16	E S 16	E S 16
25	E S 16	E S 16	E S 16	E S 18	E S 16	17	16	21	17	23	23	22	26	25	22	22	16	21	16	16	E S 16	E S 16	E S 16	E S 16
26	E S 16	E S 16	E S 13	E S 15	E S 16	16	16	24	16	24	26	26	24	24	25	23	22	23	16	16	E S 16	E S 16	E S 16	E S 16
27	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	22	22	22	25	23	26	26	27	25	25	22	22	16	E S 16	E S 16	E S 16	E S 16
28	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	23	22	22	26	26	30	27	24	23	26	24	23	17	E S 15	E S 16	E S 16	E S 16
29	E S 16	E S 16	E S 16	E S 16	E S 16	16	21	24	16	23	24	27	30	32	25	22	23	24	16	16	E S 16	E S 16	E S 16	E S 16
30	E S 16	E S 16	E S 16	E S 16	E S 15	16	21	22	23	23	22	23	25	25	24	24	22	26	B	16	E S 16	E S 16	E S 20	E S 16
MED																								
NO																								
RAN																								

TABLE 79  
**IONOSPHERIC DATA**

h'F2, Km, June 1957  
Station WASHINGTON

Lat. 38° 7N

Long. 77° 1W

Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec.

75.0W Mean Time

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
01							L	325	330	L	395	390	375	380	385	370	355	320	L						
02							L	A	L		370	330	385	350	350	385	350	U L	L						
03							L		520	435	500	490	510	570	500	505	470	405	370	A					
04							L	N				A	A		565	520	480	440	390	L	L				
05							L		530	635	615			565	520	480	440	390	L	L					
06							L	500	480	545	530	635	540	560	510	450	440	425	360						
07							L	495	520	G	720	G	S	630	600	555	555	U S	450	365	300				
08							L	L	L		470	515	550	510	550	500	415	385	325	L					
09							L	370									415	385	325	L					
10							L	360	500	565	500	530	600	540	525	510	500	425	350	U A					
11							L	360	410	390	360	370	435	405	435	405	390	365	L	U A	310				
12							L	260	L	L	370	390	390	420	400	380	380	365	U R	L					
13							L	L	295	345	380	360	400	370	400	400	380	360	300	E A	300				
14							L		370	260	430	370	375	330	415	415	400	370	L						
15							L	420	435	440	500	450	470	470	480	465	425	370	L	290					
16							L	390	L	385	430	490	450	470	430	455	450	425	340	290					
17							L	L			420	475	530	520	530	525	540	490	480	L					
18							L	380	435	480	490	480	550	465	470	510	440	390	I A	U A					
19							L	L	410	560	540	500	550	500	530	485	450	450	345	L					
20							L	585	570	660	590	610	685	570	540	520	530	425	390	L					
21							L	500	645	530	550	580	545	550	540	490	460	450	370	L	L				
22							L	420	520	535	550	575	625	630	630	530	520	455	L						
23							L	510	530	H	460	565	550	575	500	520	485	470	480	380	L				
24							L	405	440	L	570	570	710	650	620	580	540	515	475	300	L				
25							L	350	440	U F	400	460	450	450	445	450	440	425	400	330	L				
26							L	515	530	530	630	590	530	525	530	460	485	L	340	L					
27							L	450	350	430	470	385	L	415	520	450	470	330	310						
28							L	G	G	G	G	G	G	G	550	600	555	470	500	L	A				
29							L	400	L	L	530	530	620	480	450	440	450	430	370	320	L				
30							L	260	L	L	375	L	390	315	395	L	355	315	285	E A	300				
31							L	400	400	430	440	395	500	450	495	440	400	370	L	L					
32							L	L	G	G	G	G	G	G	G	705	445	600	B						
MEQ							U	390	440	480	515	500	515	510	500	515	480	440	400	340	E	300			
NO							7	20	23	26	30	28	27	30	30	29	30	29	19	7					
RAN																									



TABLE 80  
**IONOSPHERIC DATA**

h'F, Km, June 1957

75°0W Mean Time

Station WASHINGTON

Lat. 38°7N

Long. 77°1W

Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec.

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	280	280	285	275	275	270	250	230	230	230	220	220	I A	H	I A	H	H	230	250	270	260	270	270	270
02	310	295	285	295	260	265	250	250	A	A	A	A	225	220	A	A	220	235	245	260	U A	270	260	265
03	280	310	300	280	290	275	245	240	230	225	210	210	245	225	230	230	230	230	A	A	290	310	310	325
04	330	290	300	330	310	300	270	245	235	245	A	A	A	235	225	225	220	235	250	270	270	290	300	315
05	300	310	330	340	310	300	255	230	230	220	220	215	210	215	215	230	230	230	230	275	300	300	310	310
06	355	310	315	360	350	310	265	240	230	225	200	215	230	230	200	200	225	245	250	280	295	280	310	280
07	320	275	265	290	300	275	240	220	215	205	210	200	205	220	220	205	225	240	265	250	265	275	270	310
08	300	320	320	260	310	290	255	220	225	210	190	200	210	220	220	220	215	240	A	A	280	285	320	300
09	300	285	290	310	325	315	A	230	240	210	225	240	230	225	220	220	230	230	245	265	285	310	275	260
10	280	275	275	275	290	270	250	235	245	220	200	205	190	205	210	210	230	230	250	270	250	255	285	270
11	285	290	280	280	255	260	245	225	210	200	210	205	200	205	220	225	235	245	A	A	270	260	310	275
12	300	290	295	300	275	270	250	C	210	205	180	215	210	205	230	225	220	220	245	280	275	275	265	280
13	260	265	270	260	300	275	240	225	220	215	230	210	225	210	230	230	240	235	245	275	260	270	265	310
14	275	275	250	320	300	280	260	250	235	220	220	220	225	235	225	215	240	230	220	275	265	280	275	300
15	275	295	280	295	280	295	250	245	200	210	200	210	235	225	245	215	235	250	245	280	290	285	275	280
16	280	290	285	280	285	275	250	235	240	240	245	A	A	265	240	A	A	A	A	A	300	285	270	300
17	300	305	320	270	255	265	240	240	230	U A	A	A	225	220	210	215	235	230	250	260	280	280	295	320
18	310	340	340	280	285	330	270	270	235	235	210	220	210	220	200	220	235	235	250	280	280	310	295	310
19	305	275	300	310	320	310	260	220	220	210	200	210	225	230	230	225	215	230	240	A	275	300	310	280
20	270	315	340	280	280	290	230	225	215	205	200	210	220	220	225	220	230	245	H	275	280	305	305	350
21	305	330	305	350	320	290	255	230	220	220	215	185	200	230	210	225	235	225	250	280	330	360	335	295
22	280	280	290	290	290	305	260	250	210	220	220	210	200	200	210	225	230	240	250	265	295	310	280	275
23	280	280	290	290	290	280	250	245	220	230	235	210	210	210	230	225	210	245	230	260	250	280	300	310
24	320	330	280	310	330	275	225	250	225	235	225	210	240	235	200	215	240	235	265	280	275	290	325	335
25	330	310	310	310	300	315	235	230	240	225	210	210	215	235	205	210	220	235	245	290	260	285	280	300
26	370	380	350	410	415	330	260	260	230	220	210	200	200	225	225	215	255	A	A	290	270	255	A	
27	260	285	290	310	320	295	275	245	215	210	205	210	220	220	215	225	230	240	260	270	275	280	275	300
28	280	290	300	305	310	280	250	240	240	225	205	220	210	200	220	215	240	235	270	270	270	265	275	315
29	275	280	280	280	275	285	250	250	A	A	A	A	245	240	235	220	220	240	250	280	280	265	310	290
30	290	340	370	300	300	315	305	265	230	225	250	250	230	235	235	230	260	B	B	310	390	550	640	
MEQ	285	290	290	290	290	280	250	240	230	220	210	210	220	220	220	220	230	235	250	275	280	280	280	300
NO	27	30	28	26	27	28	29	29	28	27	25	25	27	29	29	28	28	28	23	24	28	26	27	27
RAN																								



TABLE 81  
**IONOSPHERIC DATA**

n'E, Km, June 1957  
 Station **WASHINGTON**

Lat. **38° 7' N**

Long. **77° 1' W**

Sweep **1.0 Mc to 25.0 Mc in 13.5 Sec.**

75.0W Mean Time

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01							119	111	I B	110	109	U B	105	105	103	U B	119	105	111	U B	115	109	119	
02						S	115	109	105	101	105	109	U B	109	109	U B	111	109	105	111	H	U B	115	119
03						125	U B	111	101	101	109	103	105	101	101	103	107	109	109	111		S		
04						A	115	109	101	101	101	105	109	109	105	109	105	109	109	111	119			
05						121	111	109	105	109	101	101	103	105	105	109	105	109	109	U S	129			
06						119	109	109	101	109	101	105	109	109	109	105	101	111	111	125				
07						U A	111	109	109	101	111	103	101	101	103	105	101	105	107	109	119			
08						115	111	109	109	109	105	105	105	103	109	109	103	115	115	115	U S			
09						U S	H	U B	101	105	109	109	109	105	101	101	109	109	B	115				
10						B	109	H	109	109	109	107	109	U B	U B	U B	103	109	109	U B	U B	125		
11						U S	121	111	109	101	109	109	109	109	107	101	109	109	109	115	A			
12						U S	C	C	A	U A	103	103	103	109	105	109	103	109	109	111	109			
13						S	U B	111	109	101	101	101	101	101	105	105	109	109	111	109	125			
14						S	109	115	103	101	101	109	109	103	105	115	109	109	111	S				
15						S	111	109	109	105	101	109	105	111	109	109	109	109	109	121				
16						S	111	H	105	109	105	101	109	109	105	107	H	105	109	109	111	119		
17						U S	129	113	111	105	101	103	103	101	105	109	109	109	H	109	109	121		
18						U S	141	111	109	115	101	101	101	101	101	101	103	109	109	119				
19						U S	129	111	109	103	105	105	105	109	105	105	H	103	109	109	121			
20						119	115	109	109	105	105	109	105	101	103	H	107	109	111	127				
21						A	115	109	105	105	105	109	A	109	A	103	101	107	109	U B	119	121		
22						111	H	109	105	109	107	109	109	109	105	105	H	H	111	H	121			
23						H	I A	120	111	109	109	109	109	109	109	109	H	109	E A	A				
24						121	H	109	109	105	109	105	109	109	109	109	109	111	U B	119	115			
25						B	111	109	109	109	109	105	109	105	103	105	103	109	109	121				
26						119	111	111	101	101	109	105	103	101	103	101	101	109	111	115				
27						115	109	109	109	101	105	101	101	105	109	109	109	109	115	119				
28						H	121	H	109	109	109	107	109	109	105	H	109	119	U B	U B				
29						S	109	111	101	103	101	107	U B	U B	I A	109	105	109	111	111	119			
30						U B	125	109	109	109	105	A	A	105	105	109	105	109	B	B	135			
MEQ						121	111	109	105	105	105	105	109	105	108	105	109	109	111	119				
NO						19	29	29	29	30	29	29	30	29	30	30	30	29	27	26				
RAN																								

TABLE 82  
**IONOSPHERIC DATA**

h'Es, Km, June 1957  
 Station WASHINGTON

Lat. 38° 7' N

Long. 77° 1' W

Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec.

75.0W Mean Time

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
01	S	S	107	S	B	B	G	G	131	119	111	111	109	115	115	121	117	G	G	B	S	S	S	S	
02		S															G		135	117	115	115	S	109	
03		S	S	B	S			129	101		115	109		G	G			129	119	109	121			119	
04					109	119	125	119	109	109	109	105	105	105	109		G	G	G	G	S	129	129	S	
05	119	111	105	111		S	G		119	125	111	115	115	105	109	111	109	111	111	125		B	B	B	S
06	B	S	S	S	S	B	G	G	G				G	G					G		B	S	B	B	
07	B	119		S	S	S	G	G	G	119	109		G	G					129	119		S	S	S	S
08	115	109		S	S	S	G	G	G			G	G	G	G	G		121	121	119	109	111	115	119	119
09	117	S	109	119	115	111	109	119	109	111	109		127	135	G	G	G		119	115	109	109	109	109	S
10	S	S	S	S									G	G	G	G		G	G						
11	109	109		S	S		119	119	119	117	115	119	115	121		G	G	G		119	111	109	S	107	109
12	117	B	115	105	103		G	C	C	103	131		115	105		G	G	G	G		119	G	S	S	S
13	S	S	121	119	115	111	117		G	G	G						G	G	G			S	S	S	S
14	S	S	S		119	119	119	129	109	121	121	119	115	111	111	119	119	145	115	113		S	S	S	B
15	119				117	121	121	115		129	121	121	117	111		129	129	125	131	125					S
16	S	S	S	S	S		G										G	G	G		S	S	S	S	
17		S	S	109	109	101	129	125	121	101	109	111	111	115	119		G	H	G	119	121		S	S	S
18	S	S	S	S		G			151	119	115	139	121	111	121	111	109	129	G	G	131	111	111		S
19	S	S				G			151	123	111	109	109	109	109	119	121		G	G		121	115	111	109
20	S	S	119	111		S	G		115	111	111	111	111	111	109	101		135	G		121	117	129	111	109
21	S	121	S	S	109	119	115		109	109	109	109	109	109	109	111	109		G	127	125	119	111	109	109
22	S	S	S	S	109		131	129	111	111	121	109		121		109	129		G		139	115	111		S
23	S	S	S	S	S	G			115	119	125	109	109	103	105		109	105	115		105	105	105	109	S
24	S	S	S	S	S	G	G	G																	S
25	S	S	S	S	S	G	G	G	115	109	109	109		G	G	G	G	G	G		119	G	S	S	S
26	S	S	S	S	S	G	G	G	119	119	109			119		G	G	G	G		129	115	109	109	109
27	S	105	S	S	S		131	131	129	121	119	119	111	109	105	109	G	G		115	111	119	109	109	109
28	S	109	S	S	S	G			135	131	119	121	111	119	111		G	G		111	125	119	109	111	111
29	109	109	111	S	S	135			121	109	115	109	109	109	109	109		G	G	135			111	109	109
30	S	S	S	S	S				141	109	109	105	103	109	105	109	115	129	121	B	B	G	S	195	149
MEQ	117	109	113	115	115	119	121	119	111	115	111	111	109	111	111	119	118	121	119	114	111	111	109	109	
NO	8	8	8	8	11	14	19	21	25	27	27	25	22	21	17	17	16	12	23	22	16	17	11	11	
RAN																									

TABLE 83  
**IONOSPHERIC DATA**

(M3000)F2, June 1957

75.0W Mean Time

Station WASHINGTON

Lat. 38.7N

Long. 77.1W

Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec.

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
01	265	265	280	270	280 <sup>F</sup>	275	300	290 <sup>V</sup>	285	260	260	260	265	270	265	265	265	270	270	270	270	270	265	270	
02	260	260	265	275	275	285	305	280 <sup>H</sup>	285	265	265	270	265	265	265	260	270	270	270	280	275	275	270	265 <sup>F</sup>	
03	265	250	260	260	260	270	285	290 <sup>R</sup>	240 <sup>F</sup>	260	245	250 <sup>A</sup>	250 <sup>A</sup>	230	245	240	250	270	260	245	260	255 <sup>U S</sup>	255 <sup>U S</sup>	260	
04	250	265	245 <sup>U S</sup>	240	240 <sup>U S</sup>	260	270		250	230	230			235	240	245	245	260	270 <sup>U S</sup>	265	275	270	265 <sup>U S</sup>	240	
05	240	240	245	250	265	265	270	245	255	245	245	220	235	230	235	250	255 <sup>U S</sup>	255	260	265	245	260	255 <sup>U S</sup>	245	
06	245	270	260	230	230	265	255	250	250		210			230	230	235	235	250	260	260	250	250	250	245	
07	260	280	265	270	265	285	270	270	265	255	245	240	245	240	240	245	265	265	275	270	270	260	260	255 <sup>F</sup>	
08	255	265	250	265	270	275	290	280	250	230	245	240	230	240	240	240	245	255	260	260	260	255 <sup>F</sup>	260	265 <sup>F</sup>	
09	270	270	270	270	265	280	280	285	270	265	270	265	260	265	255	255	265	270	280	280	275	280	280	270	
10	265	265	270	275	270	285	295	290	260	275	265	265	260	255	255	260	255	265	270	270	275	270	270	275	
11	275	255	260	265	265 <sup>U S</sup>	280	295	275 <sup>C</sup>	300	275	265	270	260	260	260	255	260	265	270	270	275	265	265	270	
12	265	265	260	270	275	280			280	290	265	260	265	245	260	260	255	265	260	265	270	265	265	260	
13	260	265	250	255	265	290	260	250	260	245	260	245	250	250	250	250	260	260	275	270	265	275	265	260	
14	260	270	265	265	260	280	270	275	275	265	245	255	250	260	255	255	250	260	275	280	260	260	260	255	
15	260	260	240	250	260	275	260	270	265	255	250	230	235	235	240	230	240	240	235	260	255	255	260	260	
16	255	260	250	265	260	280	235	270	260	250	250	250	240	260	250	240	255	260	265	275	260	270	260	250	
17	255	255 <sup>F</sup>	240	260	265	280	280	265	250	230	240	245	235	245	240	245	250	245	265	260	260	255	250	245	
18	250	240	240	260	250	265	255	235	230	220	230	220	215	230	235	240	230	260	250	260	260	250	250	235	
19	245	255	255	250	245	260	290	250	225	240	215	230	240	235	235	245	250	245	260	265	265	260	255	265	
20	265	240	250	270	260	265	255	260	240	235	240	240	225	230	220	235	235	250	250	275	270	255 <sup>F</sup>	255 <sup>U S</sup>	245	
21	250	245	245	235	245	260	270	250	240	260	230	235	230	245	240	245	250	240	270	265	260	260	260	255 <sup>F</sup>	
22	260	255	250	260	260	250	250	255	260	230	235	210	220	230	230	240	240	250	260	255	260	250	255	260	
23	265	260	260	280	280	270	280	250	270	260	260	260	260	250	260	255	255	255	265	265	280	260	245	245	
24	235	240	265	255	235	255	265	245	245	245	230	230	240	240	240	250	250	260	275	275	265	260	245	245	
25	245	245	240	245	255	260	250	260	265	260	250	270	260	265	240	250	240	250	265	280	265	255	260	240	
26	240	235	260	230	250	260	295							235	230	230	250	240	260	260	270	275	255	260	
27	235	270	260	260	255	280	280	300	230	250	250	230	250	260	270	250	260	270	275	270	270	270	270	260	
28	265	265	260	265	260	270	300	315	280	275	270	265	260	285	260	265	265	280	280	275	275	270	270	275	
29	280	270	260	270	270	280	280	265	270	260	265	270	245	255	250	255	270	265	265	270	280	275	270	260	
30	260	240	230	260	260	270	270	225								205	230	215	300	240	230	205			
MEQ	260	260	260	260	260	270	270	265	260	250	245	245	245	245	240	250	250	260	265	270	265	260	260	260	
NO	30	30	30	30	30	30	29	28	30	30	30	29	28	30	30	30	30	30	29	30	30	30	30	29	
RAN																									



TABLE 84  
**IONOSPHERIC DATA**

(M3000)F1, June 1957

75.0W Mean Time

Station WASHINGTON

Lat. 38.7N

Long. 77.1W

Sweep 1.0 Mc to 25.0 Mc in 13.5 Sec.

Manual ☐ Automatic ☒

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01							L	L	350	L	340	U R	U A	H	340	340	335	H	L	L				
02								L	A	L	A	A	H	H	315	330	345	A	L	L				
03								L	340	360	370	U H	360	350	365	365	370	360	U L	L	A			
04							L	U R	340	345	360	A	A	U R	370	340	350	340	325	L				
05							L	345	350	365	380	A	375	370	370	360	H	A	H	L	L			
06							310	H	330	360	370	380	350	370	370	385	380	360	350	320	L			
07							330	H	330	335	360	370	360	370	370	375	370	335	350	L	L			
08							L	330	325	360	365	360	365	370	370	360	365	360	H	L	L			
09							A	L	340	H	320	A	350	R	350	330	H	335	L	L	A			
10								L	L	L	H	H	H	H	H	H	H	L	L	L				
11							L	L	H	H	365	335	335	325	325	350	325	310	345	330	A	A		
12									U H	L	345	L	315	350	360	355	340	325	350	315	L			
13							320	H	345	U H	360	H	H	H	H	U S	H	350	335	L	L			
14							310	325	340	350	U R	U R	U R	360	355	355	350	345	315	L	L			
15								L	335	330	360	365	375	350	350	345	360	310	315	L				
16							L	330	335	350	345	350	340	345	360	320	A	350	A	A				
17							L	L	U H	340	345	A	U A	U R	U R	350	350	350	340	L	L			
18							L	340	345	350	380	370	360	350	370	360	350	330	320	L				
19							L	360	360	350	380	350	360	A	355	340	340	330	330	L	L			
20							L	310	335	365	375	350	360	A	360	360	335	350	L	L				
21							L	U R	U H	360	335	325	375	370	350	350	360	360	330	340	320	L		
22							310	330	340	370	360	A	H	385	380	370	335	360	340	320	L			
23							330	330	340	360	365	380	370	360	360	370	340	340	L	L	L			
24							L	U L	320	340	360	360	350	360	350	365	380	360	340	L	L	L		
25							U H	320	350	360	A	350	H	H	H	H	H	L	L					
26							F	340	320	370	370	380	370	360	350	350	360	335	315	L	A			
27							L	315	330	350	360	380	355	360	355	340	320	345	340	L	L			
28							L	L	L	L	345	L	H	330	370	340	325	335	345	L	A			
29							L	320	340	330	350	A	350	A	320	340	340	330	335	L				
30							L	U R	335	360	365	360	365	385	380	370	360	350	B	B				
MEQ							320	330	345	360	360	350	360	355	350	350	340	340	320					
NO							10	20	27	24	26	24	28	27	30	29	28	23	7					
RAN																								



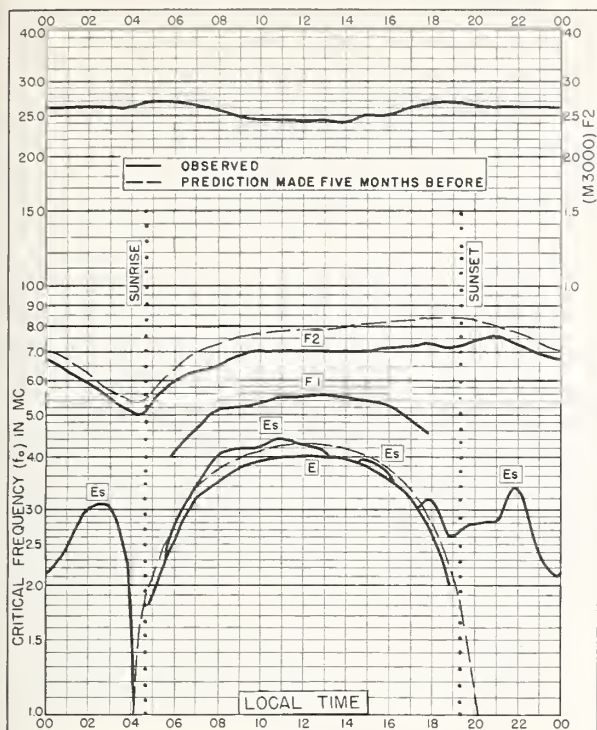
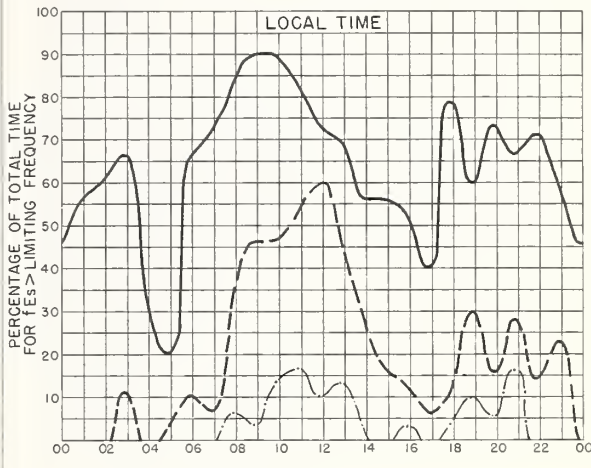
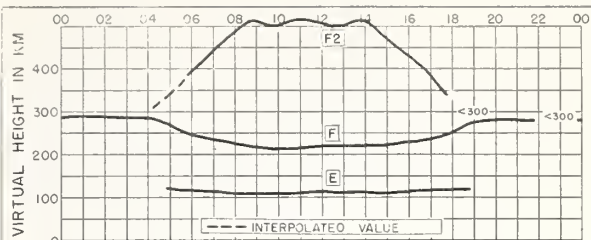


Fig. 1. WASHINGTON, D. C.  
38.7°N, 77.1°W

JUNE 1957



— LIMITING FREQUENCY = 3 Mc.  
- - - LIMITING FREQUENCY = 5 Mc.  
- · - · - LIMITING FREQUENCY = 7 Mc.

Fig. 2. WASHINGTON, D. C.

JUNE 1957

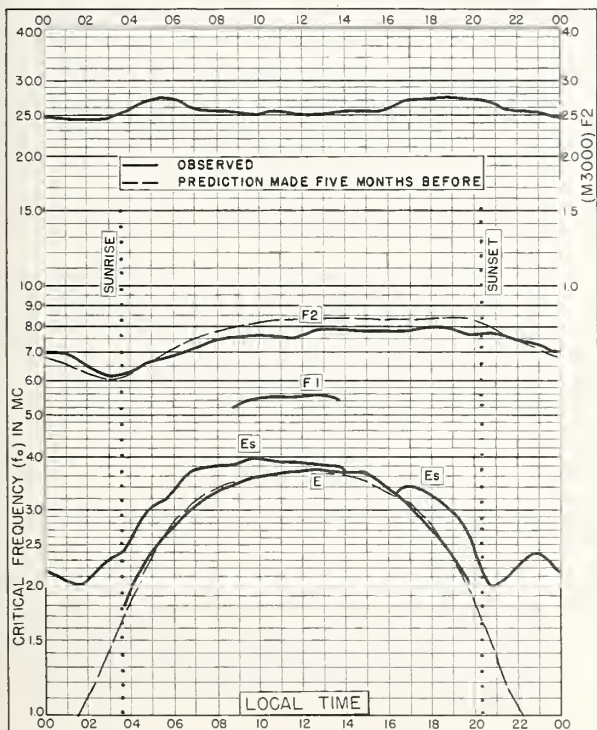
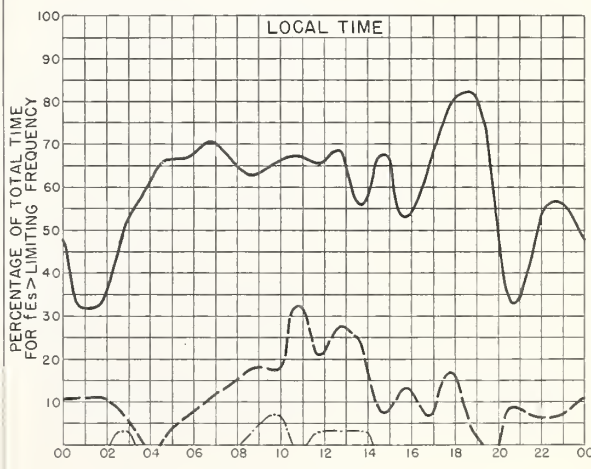
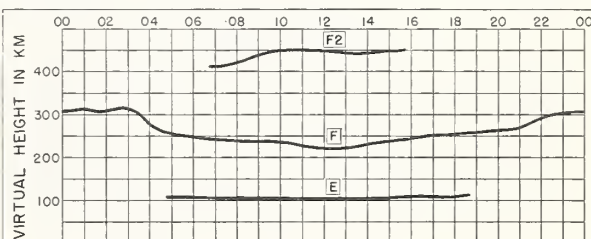


Fig. 3. OSLO, NORWAY  
60.0°N, 11.1°E

MAY 1957



— LIMITING FREQUENCY = 3 Mc.  
- - - LIMITING FREQUENCY = 5 Mc.  
- · - · - LIMITING FREQUENCY = 7 Mc.

Fig. 4. OSLO, NORWAY

MAY 1957

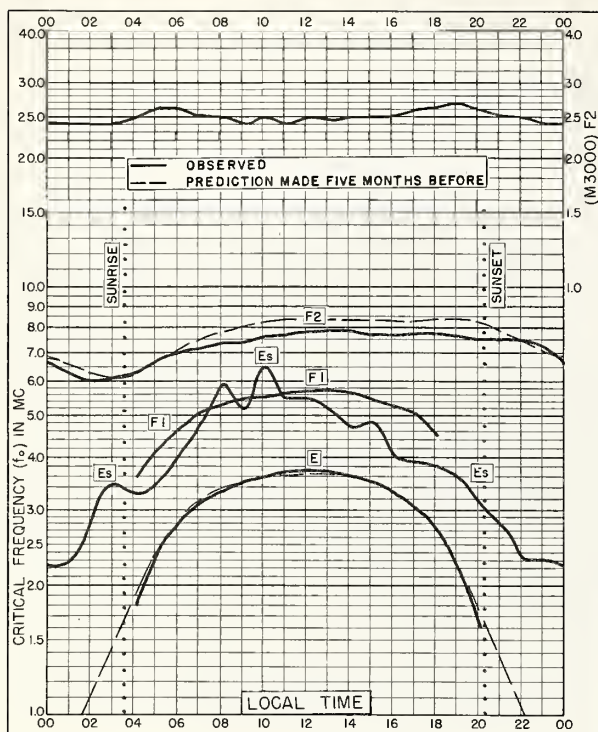


Fig. 5. UPSALA, SWEDEN  
59.8°N, 17.6°E

MAY 1957

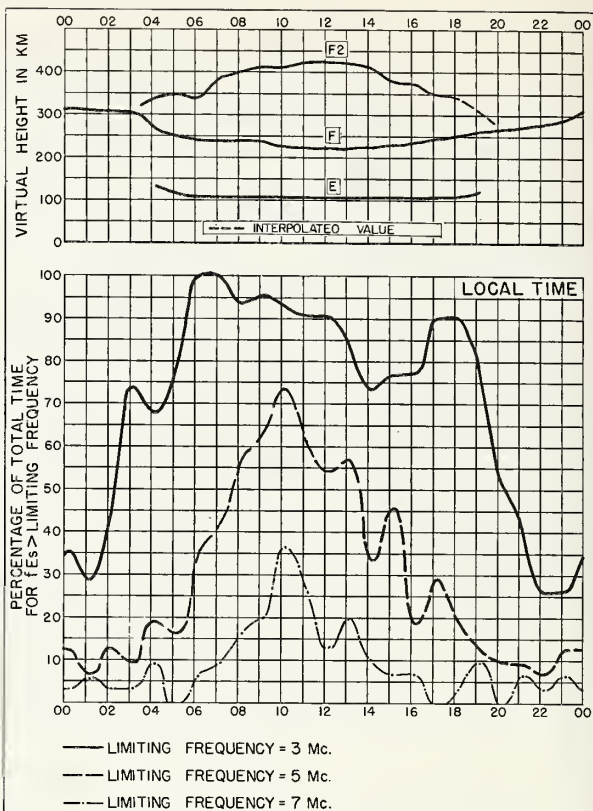


Fig. 6. UPSALA, SWEDEN

MAY 1957

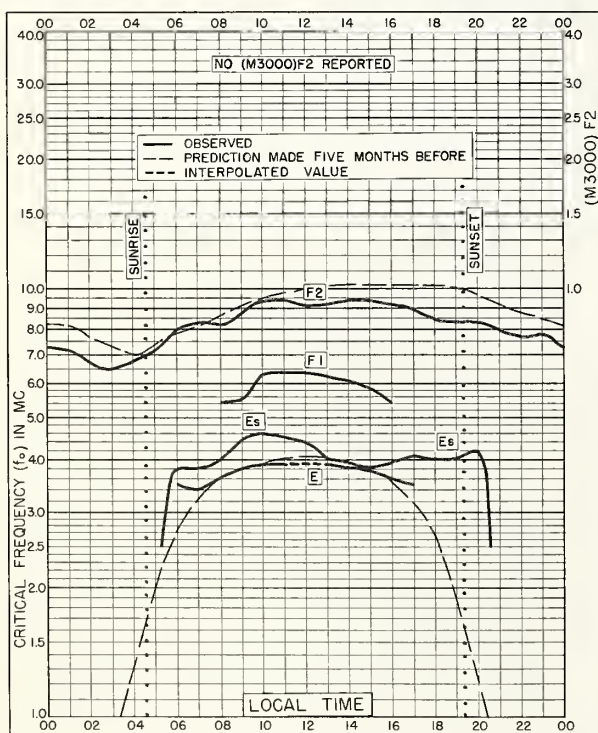


Fig. 7. GRAZ, AUSTRIA  
47.1°N, 15.5°E

MAY 1957

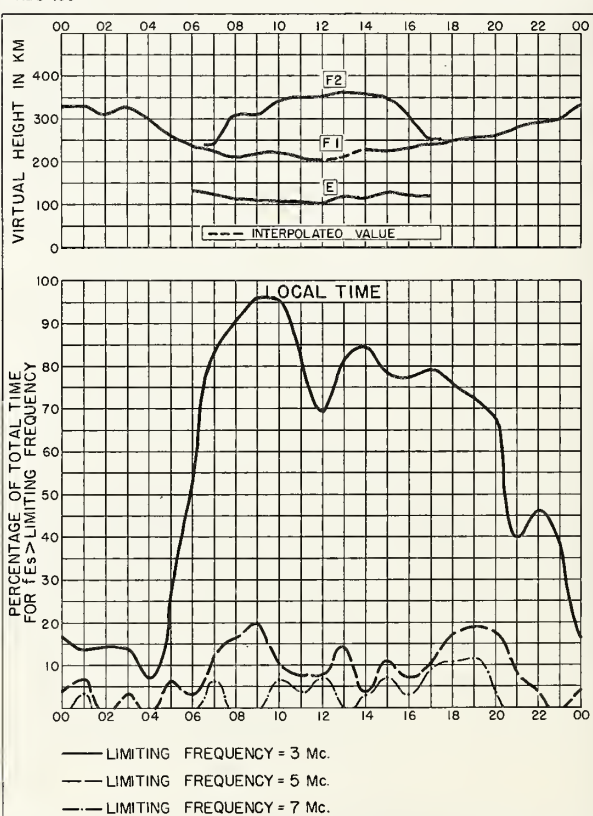


Fig. 8. GRAZ, AUSTRIA

MAY 1957



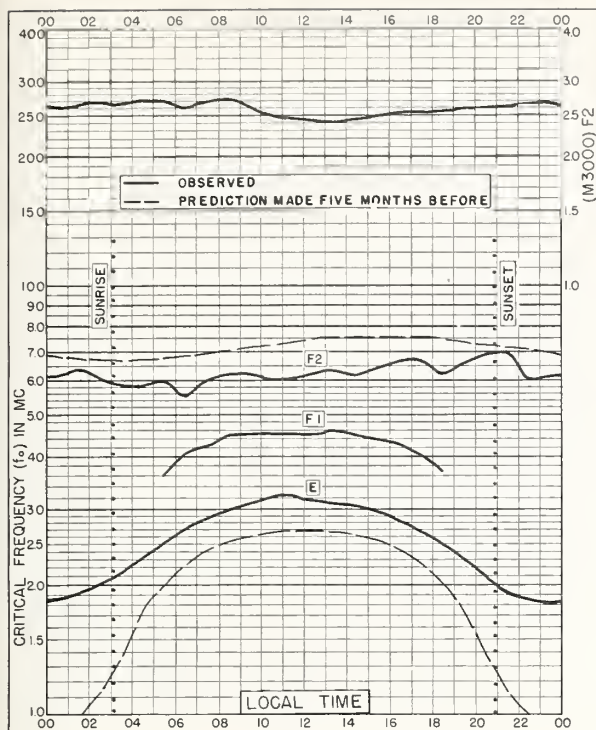


Fig. 9. THULE, GREENLAND  
76.6°N, 68.7°W

APRIL 1957

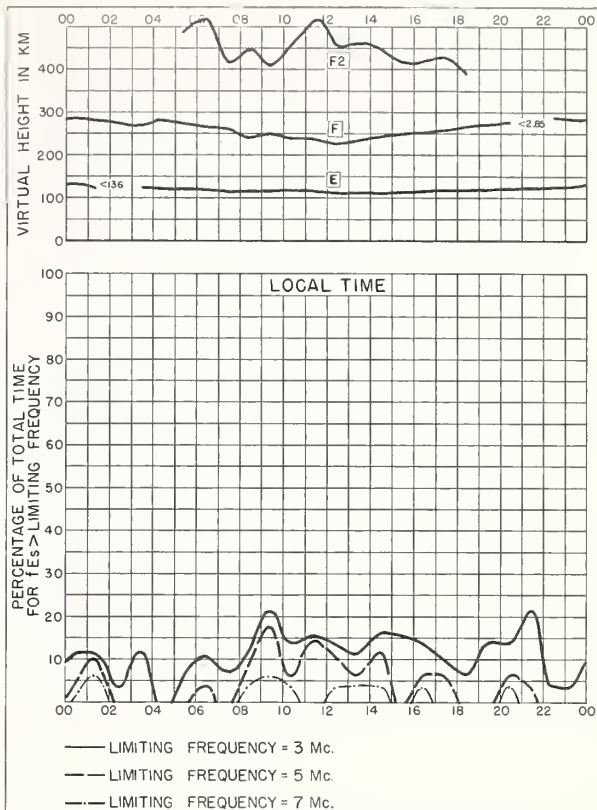


Fig. 10. THULE, GREENLAND

APRIL 1957

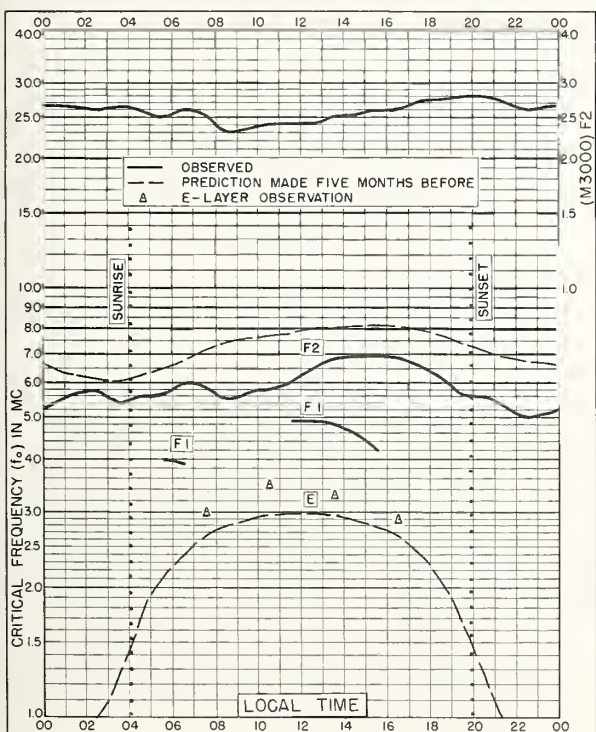


Fig. 11. POINT BARROW, ALASKA  
71.3°N, 156.8°W

APRIL 1957

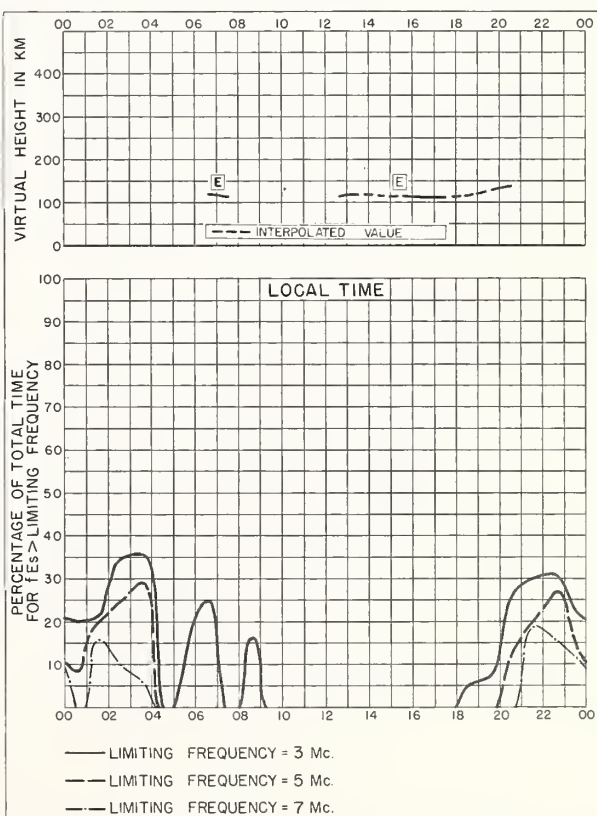


Fig. 12. POINT BARROW, ALASKA

APRIL 1957

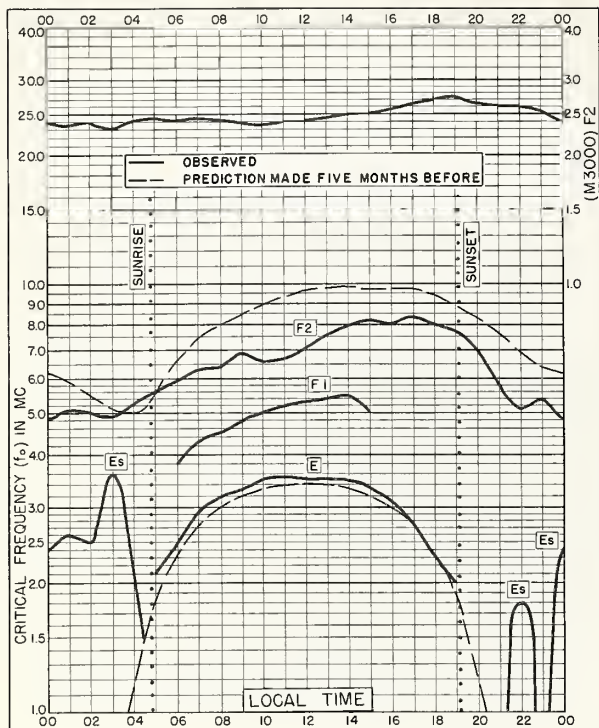


Fig. 13. ANCHORAGE, ALASKA  
61.2°N, 149.9°W

APRIL 1957

NBS 503

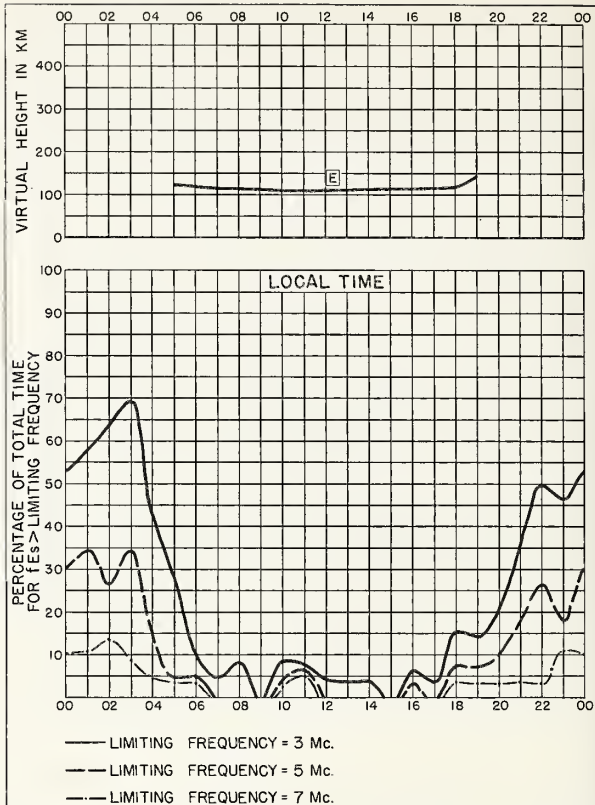


Fig. 14. ANCHORAGE, ALASKA

APRIL 1957

NBS 490

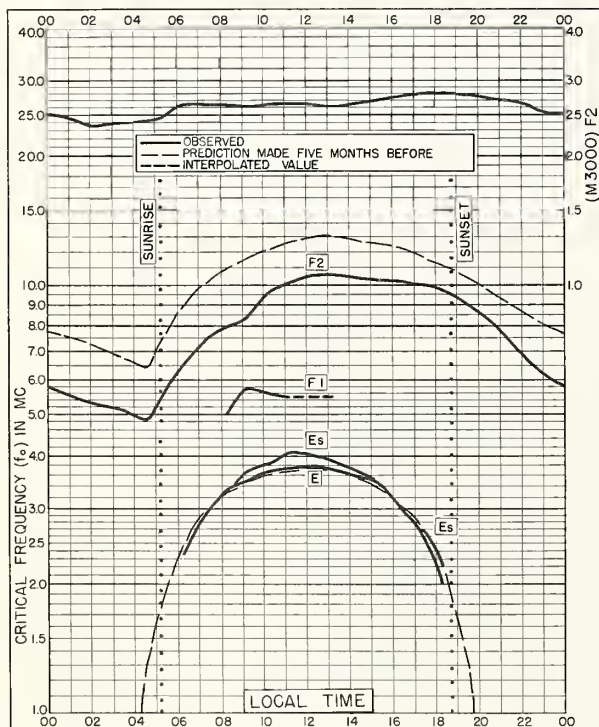


Fig. 15. ADAM, ALASKA  
51.9°N, 176.6°W

APRIL 1957

NBS 503

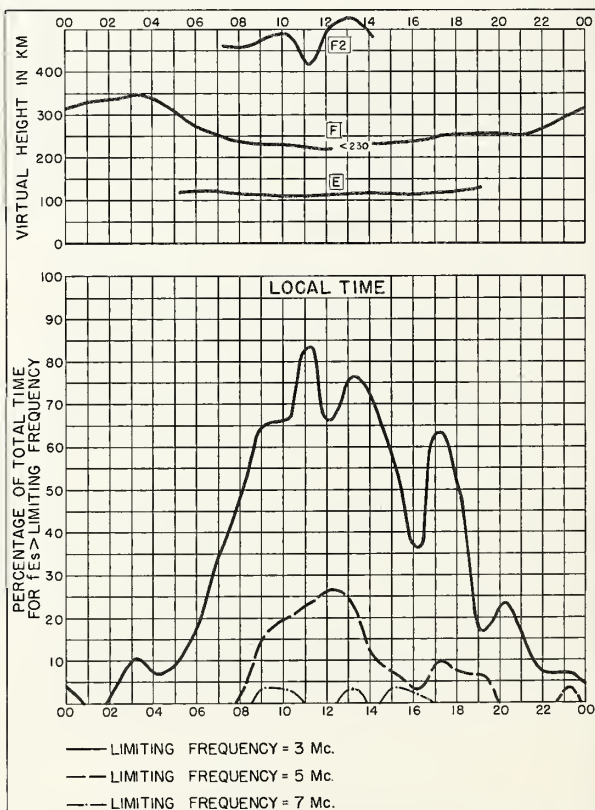


Fig. 16. ADAM, ALASKA

APRIL 1957

NBS 490

NBS 490



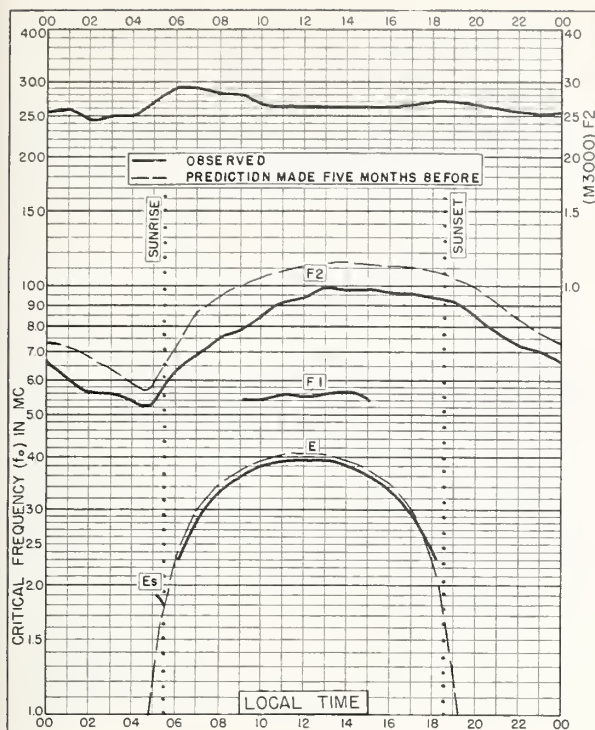


Fig. 17. FT. MONMOUTH, NEW JERSEY  
40.3°N, 74.1°W  
APRIL 1957

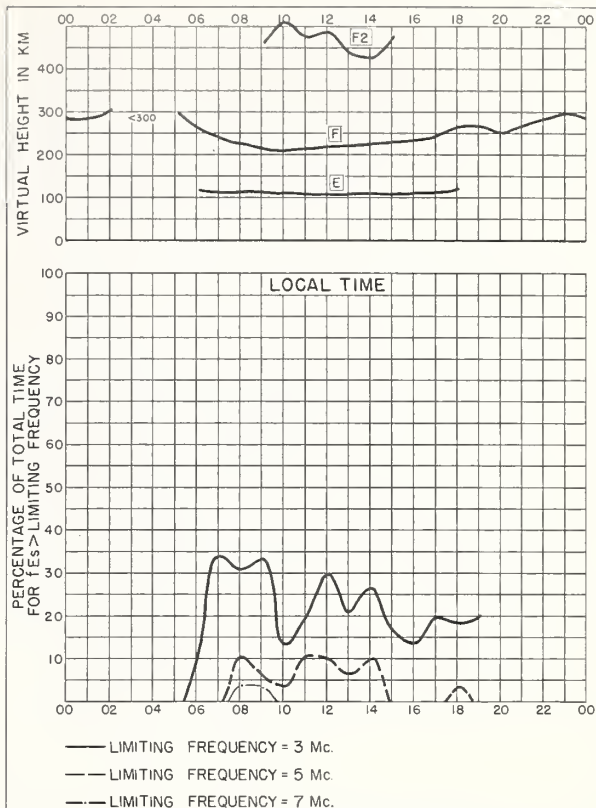


Fig. 18. FT. MONMOUTH, NEW JERSEY  
APRIL 1957

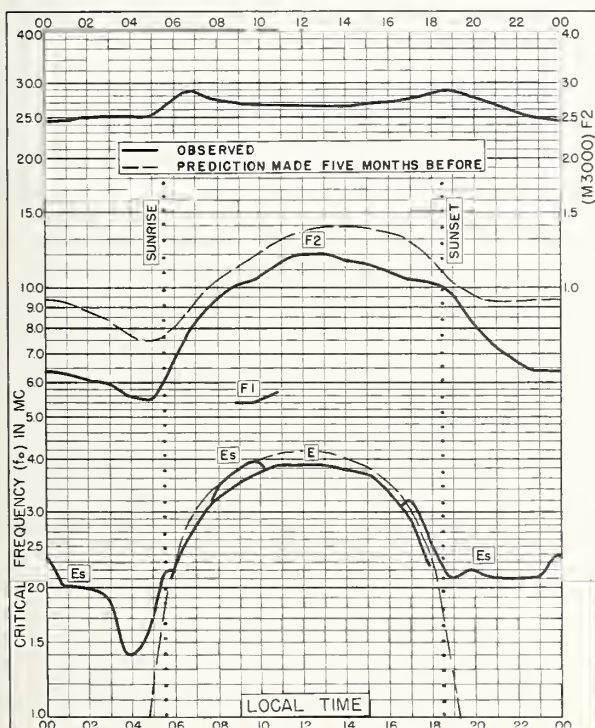


Fig. 19. SAN FRANCISCO, CALIFORNIA  
37.4°N, 122.2°W  
APRIL 1957

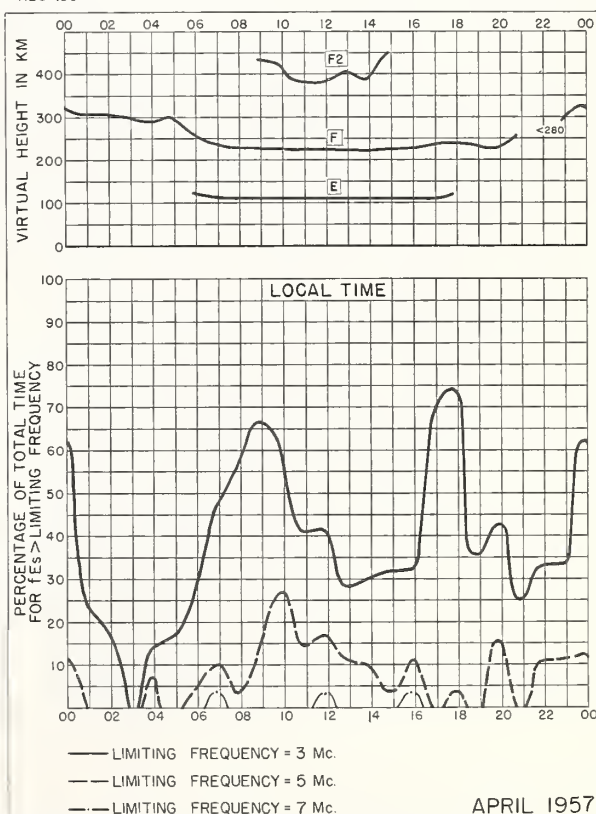
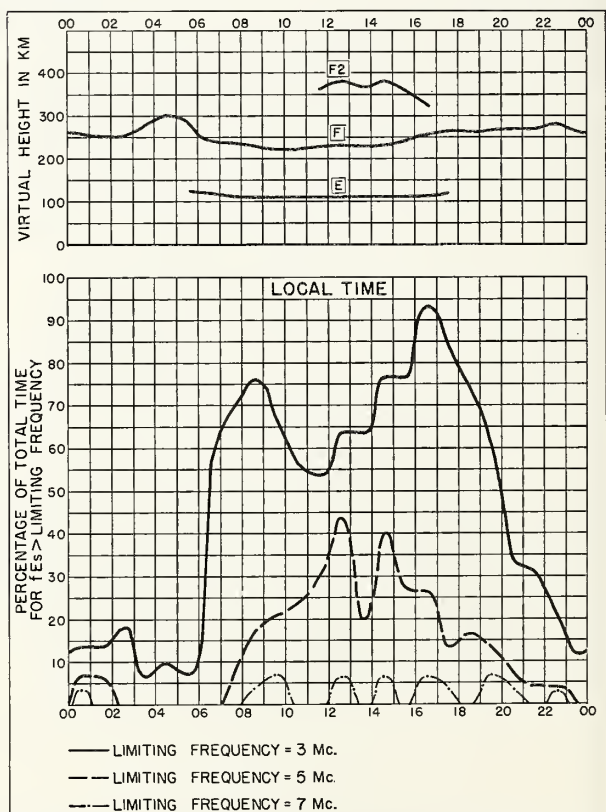
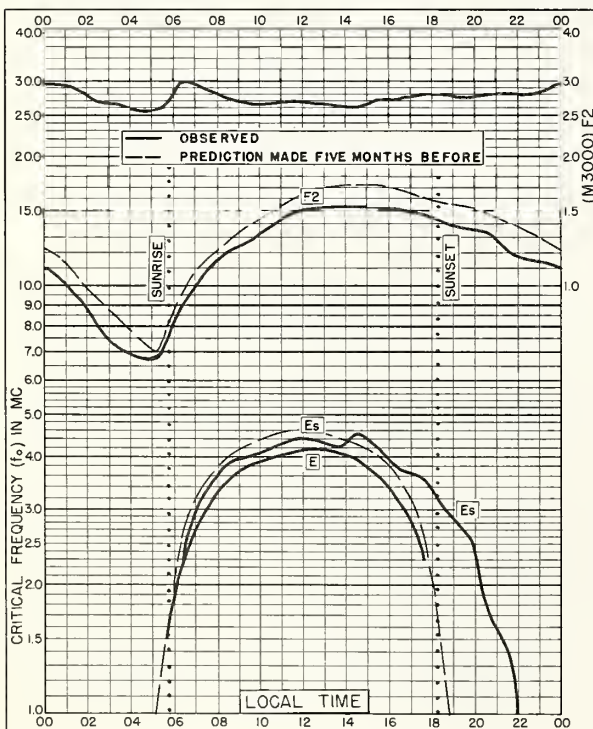
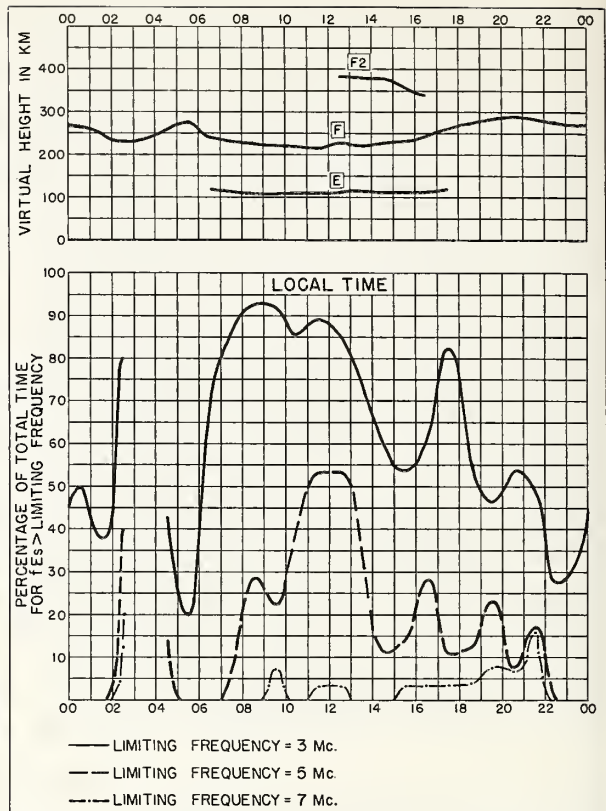
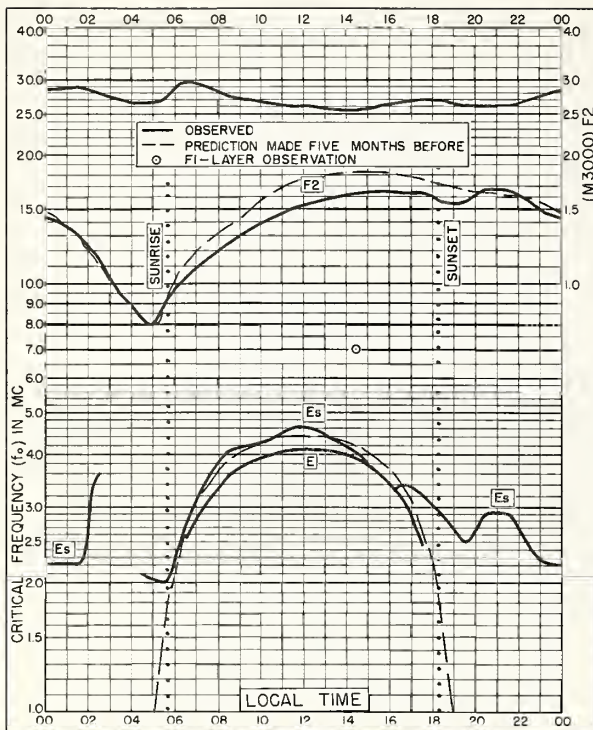


Fig. 20. SAN FRANCISCO, CALIFORNIA

APRIL 1957





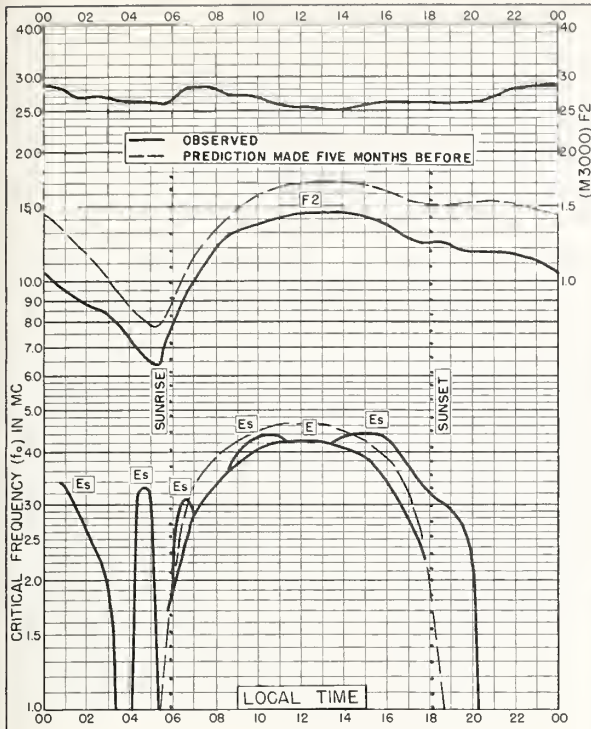


Fig. 25. PANAMA CANAL ZONE  
9.4°N, 79.9°W

APRIL 1957

NBS 503

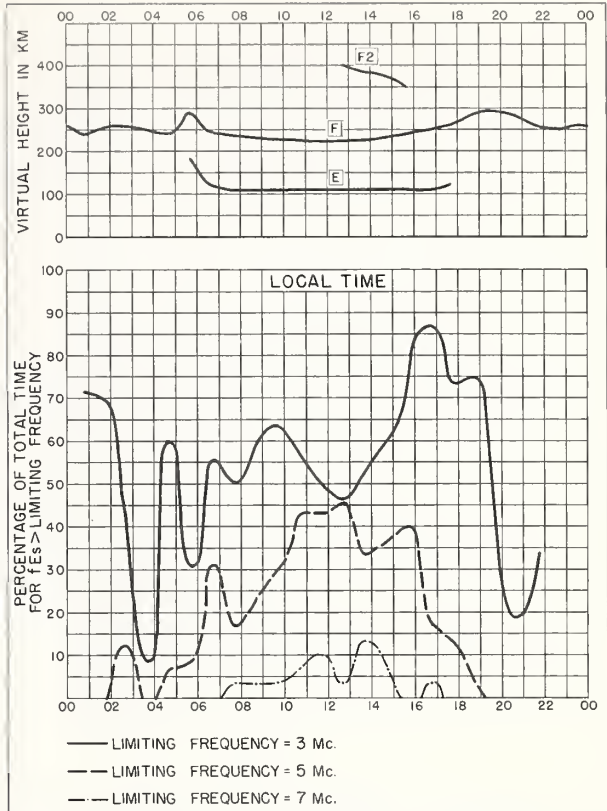


Fig. 26. PANAMA CANAL ZONE

APRIL 1957

NBS 490

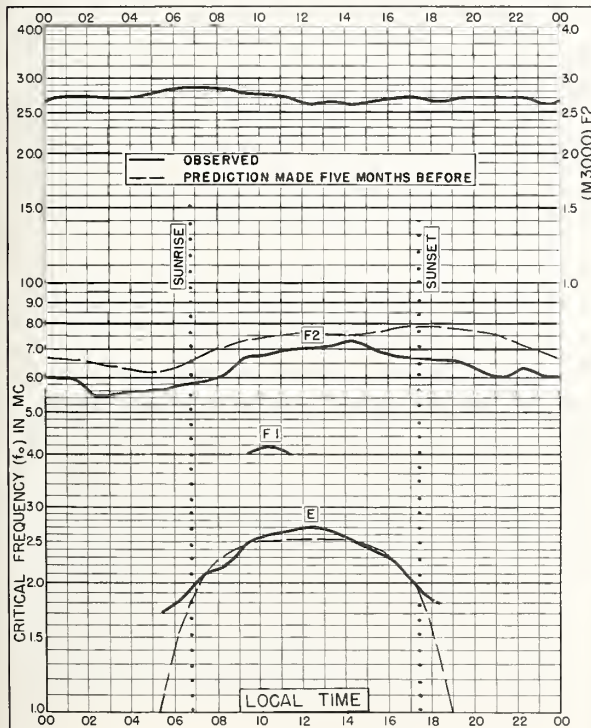


Fig. 27. THULE, GREENLAND  
76.6°N, 68.7°W

MARCH 1957

NBS 503

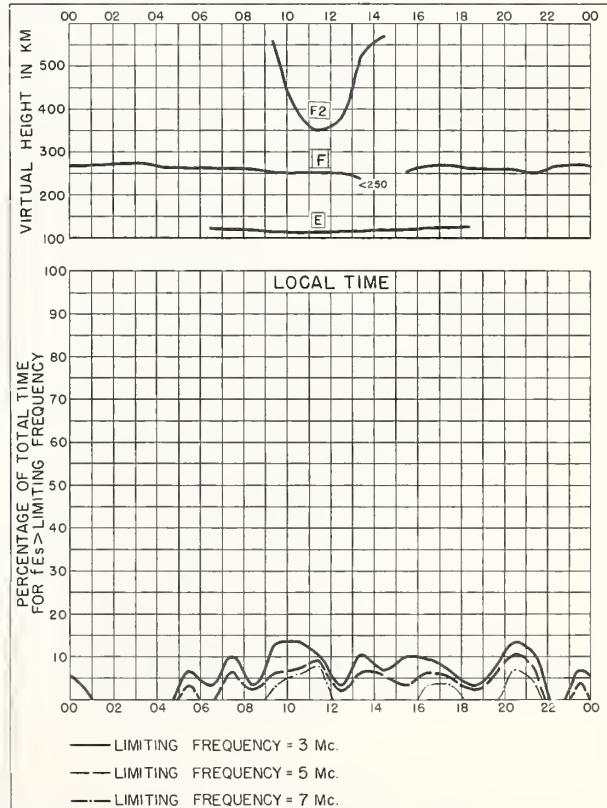


Fig. 28. THULE, GREENLAND

MARCH 1957

NBS 490

NBS 490

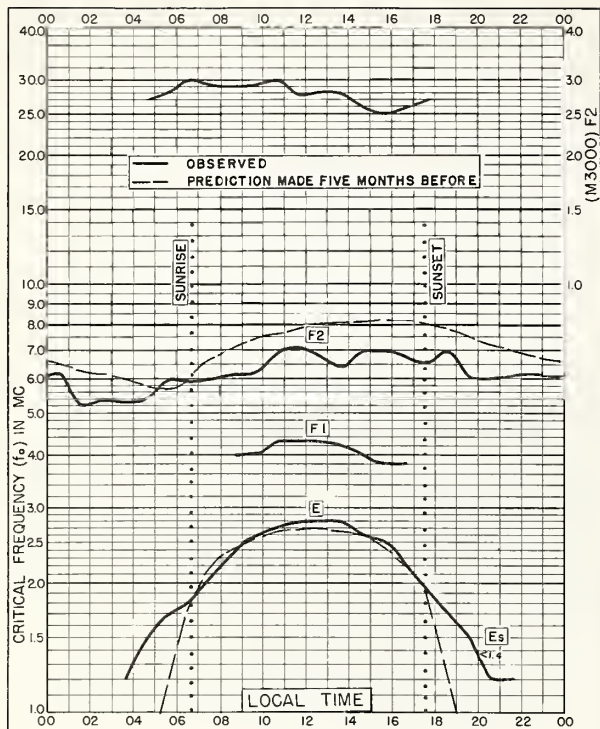


Fig. 29. RESOLUTE BAY, CANADA  
74.7°N, 94.9°W

MARCH 1957

NBS 503

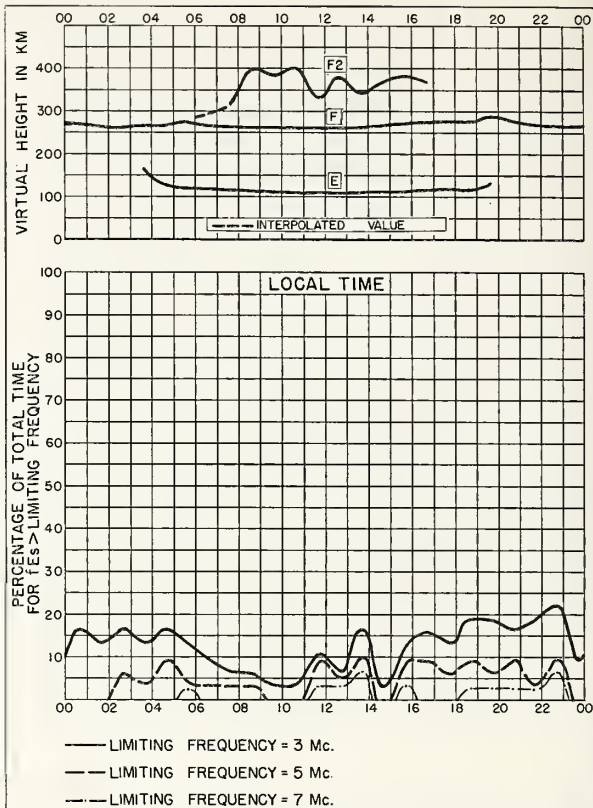


Fig. 30. RESOLUTE BAY, CANADA

MARCH 1957

NBS 490

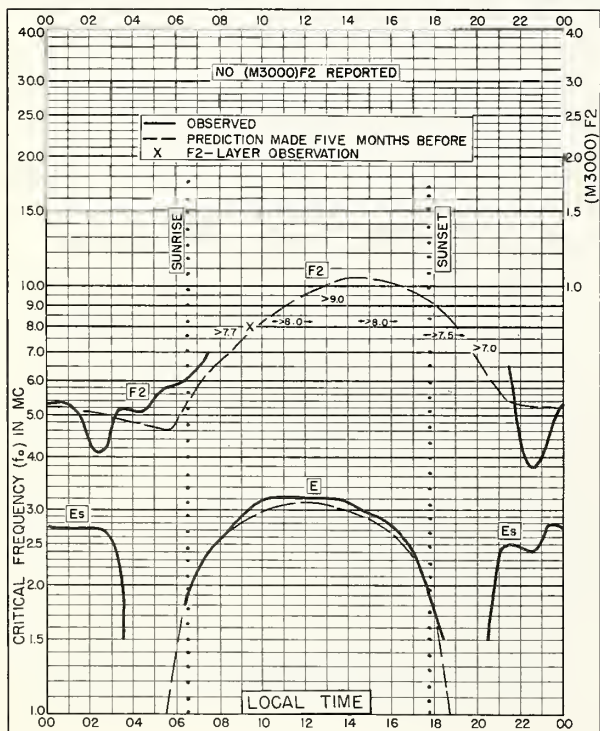


Fig. 31. LULEA, SWEDEN  
65.6°N, 22.1°E

MARCH 1957

NBS 503

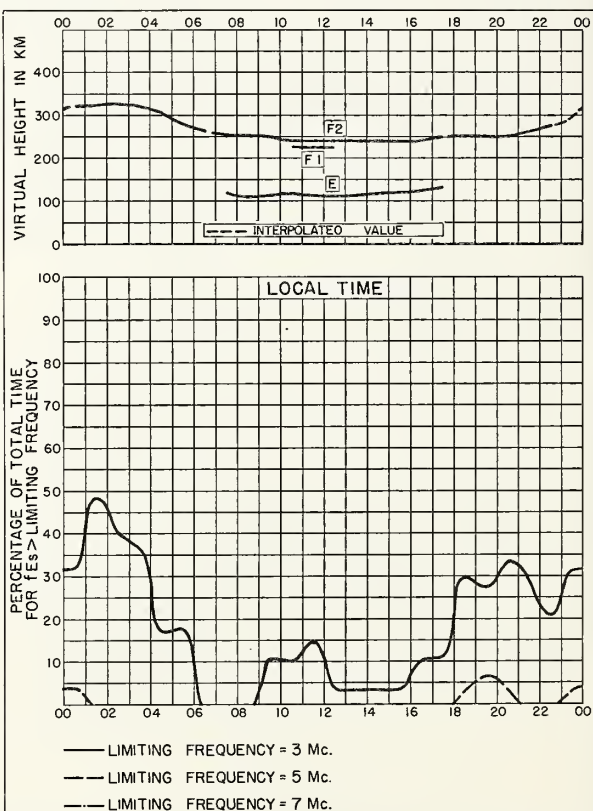


Fig. 32. LULEA, SWEDEN

MARCH 1957

NBS 490



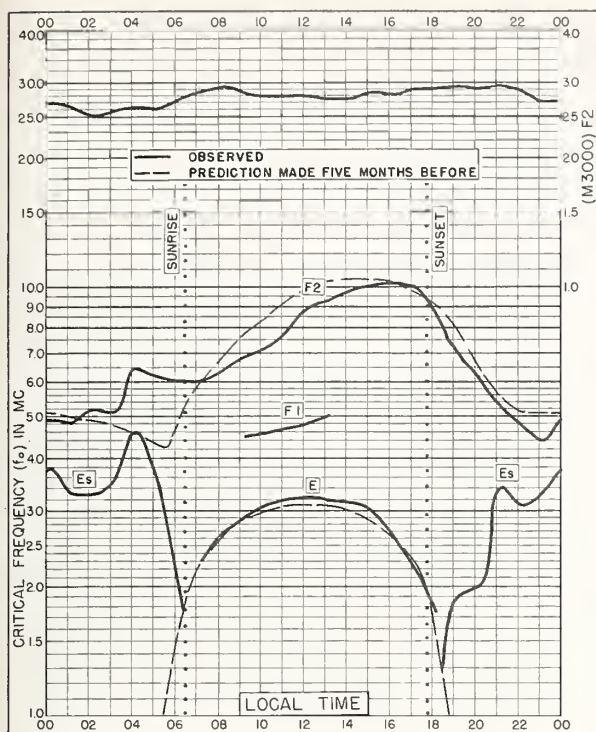


Fig. 33. FAIRBANKS, ALASKA  
64.9°N, 147.8°W

MARCH 1957

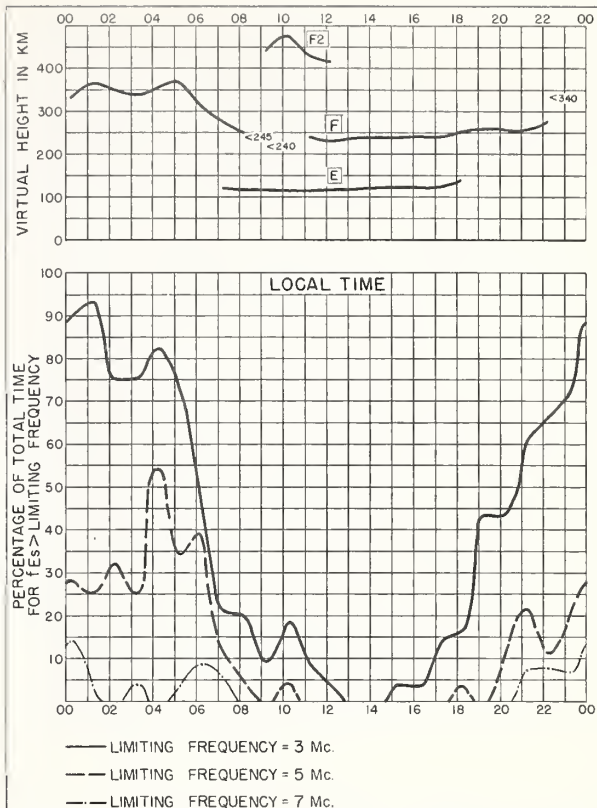


Fig. 34. FAIRBANKS, ALASKA

MARCH 1957

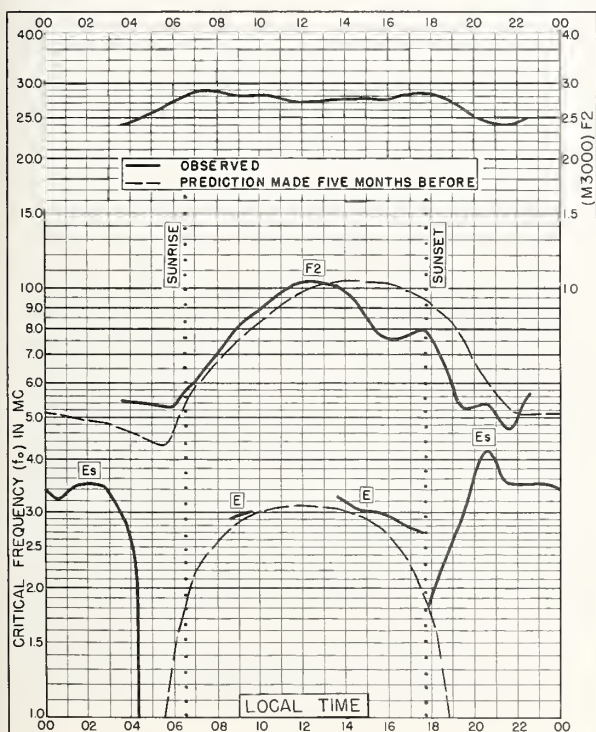


Fig. 35. REYKJAVIK, ICELAND  
64.1°N, 21.8°W

MARCH 1957

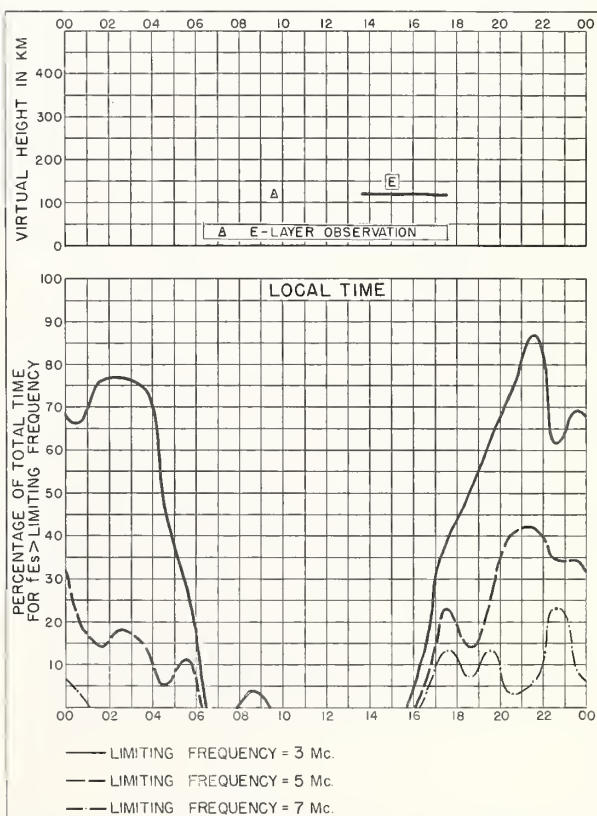


Fig. 36. REYKJAVIK, ICELAND

MARCH 1957

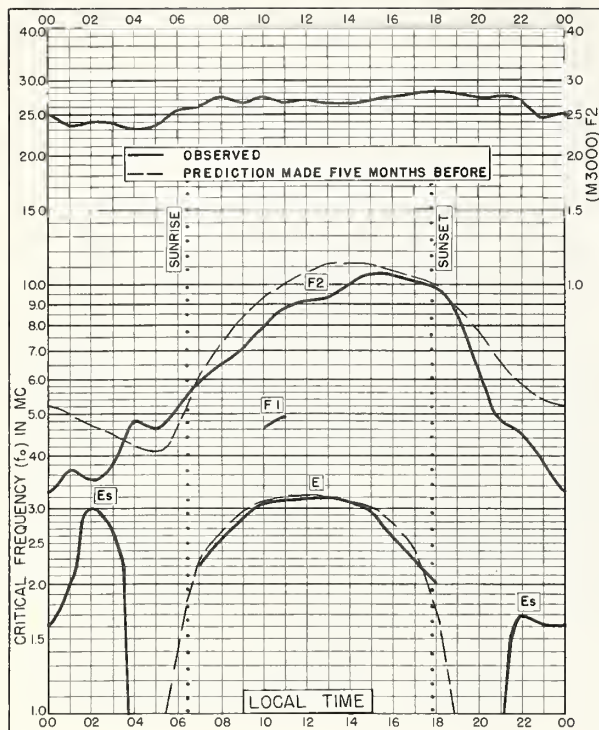


Fig. 37. ANCHORAGE, ALASKA  
61.2°N, 149.9°W

MARCH 1957

NBS 503

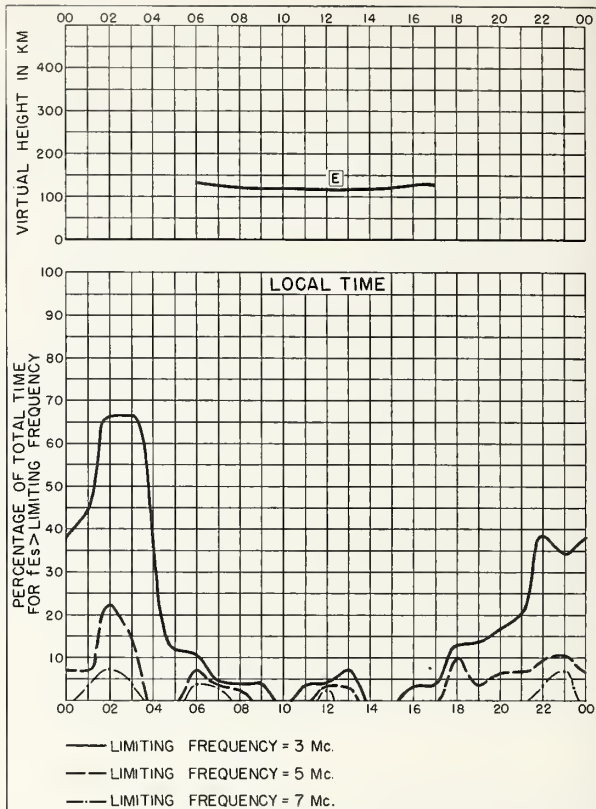


Fig. 38. ANCHORAGE, ALASKA

MARCH 1957

NBS 490

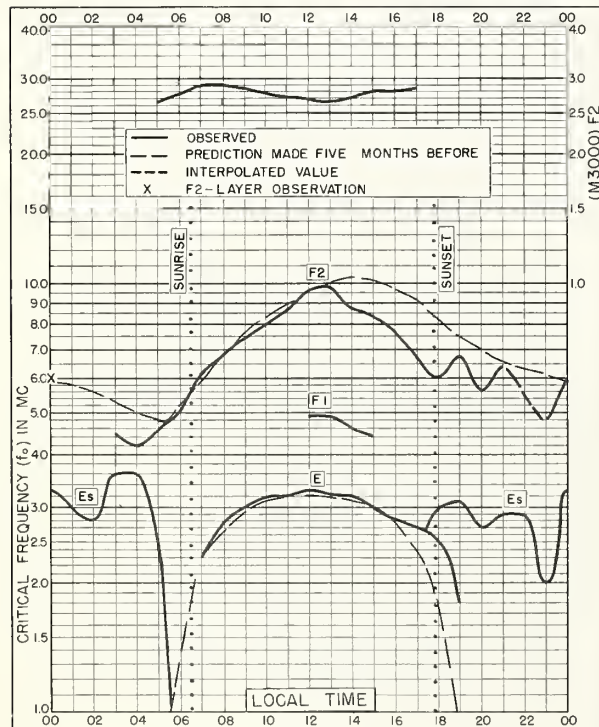


Fig. 39. NARSARSSUAK, GREENLAND  
61.2°N, 45.4°W

MARCH 1957

NBS 503

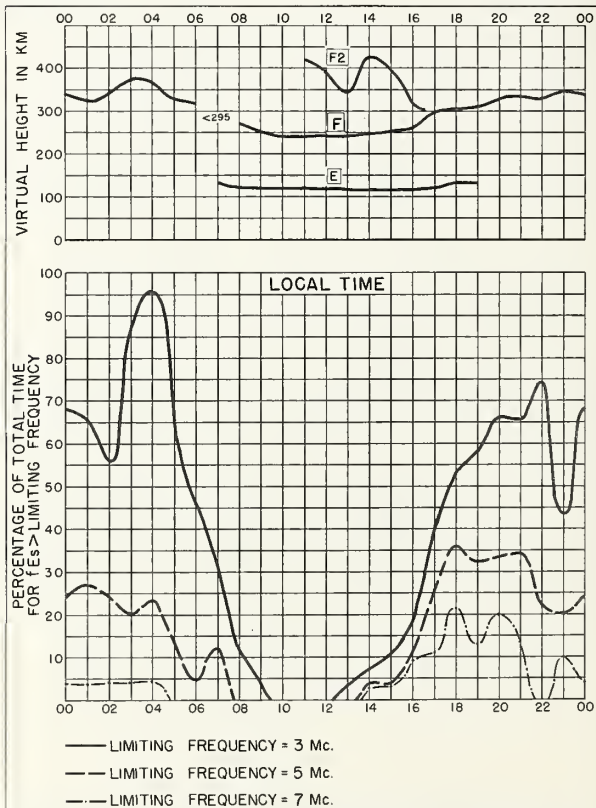


Fig. 40. NARSARSSUAK, GREENLAND MARCH 1957

NBS 490

N. & S. GEOPHYSICAL RESEARCH OFFICE 20077



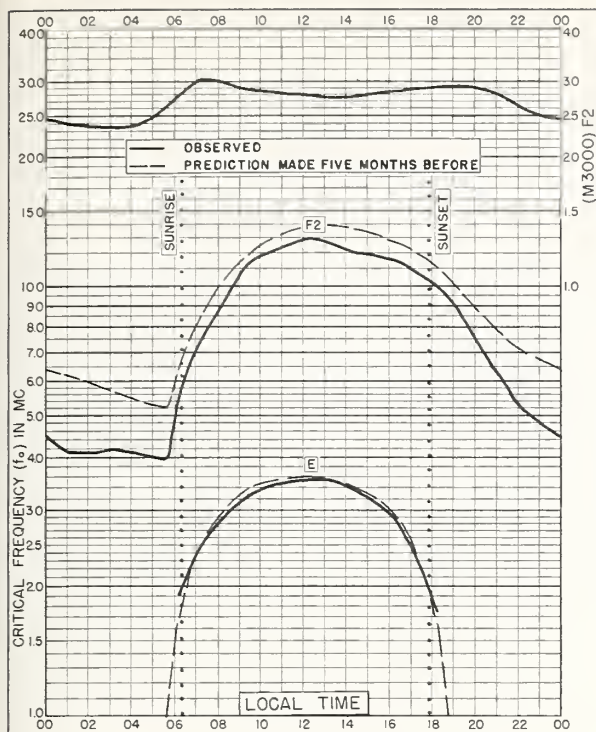


Fig. 41. ADAK, ALASKA  
51.9°N, 176.6°W

MARCH 1957

NBS 503

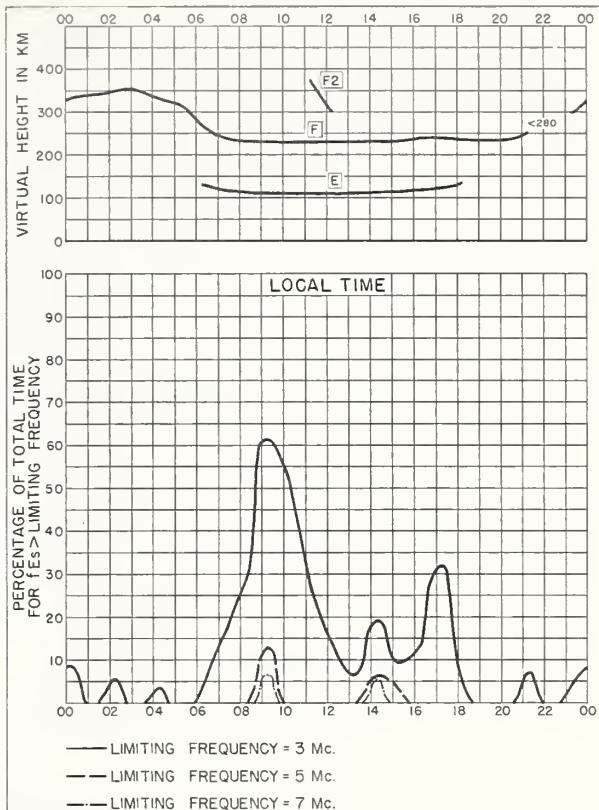


Fig. 42. ADAK, ALASKA

MARCH 1957

NBS 490

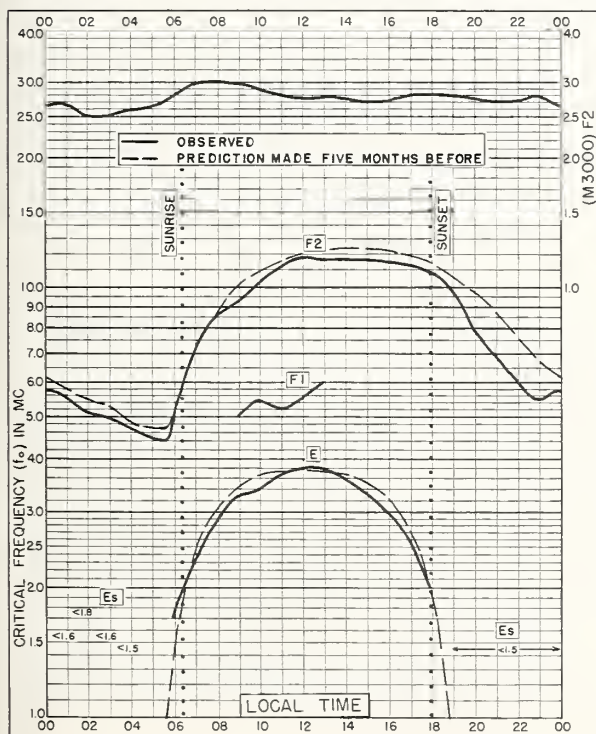


Fig. 43. OTTAWA, CANADA  
45.4°N, 75.9°W

MARCH 1957

NBS 503

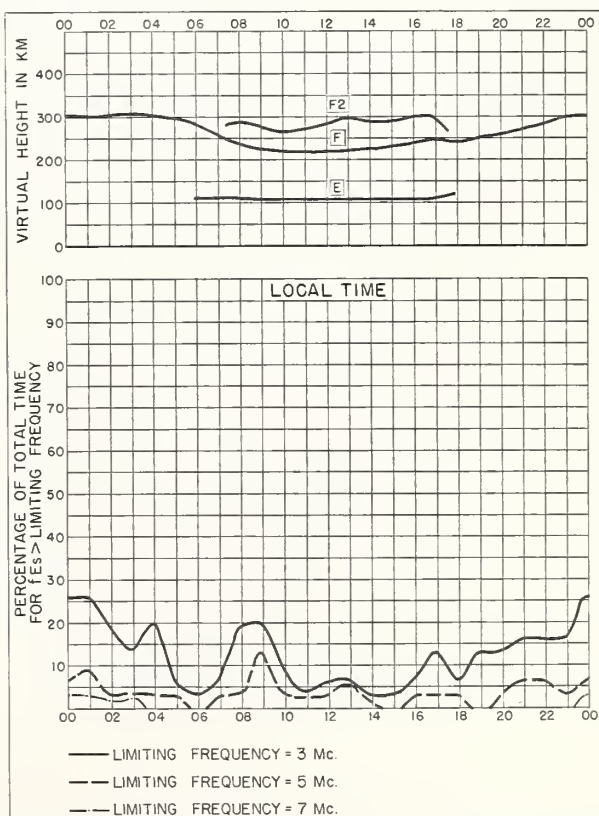


Fig. 44. OTTAWA, CANADA

MARCH 1957

NBS 490

NBS 503

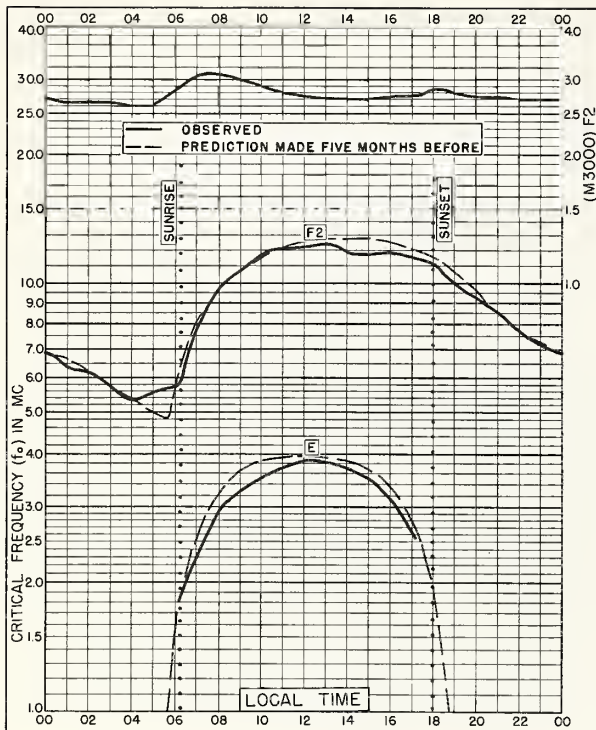


Fig. 45. FT. MONMOUTH, NEW JERSEY  
40.3°N, 74.1°W  
MARCH 1957

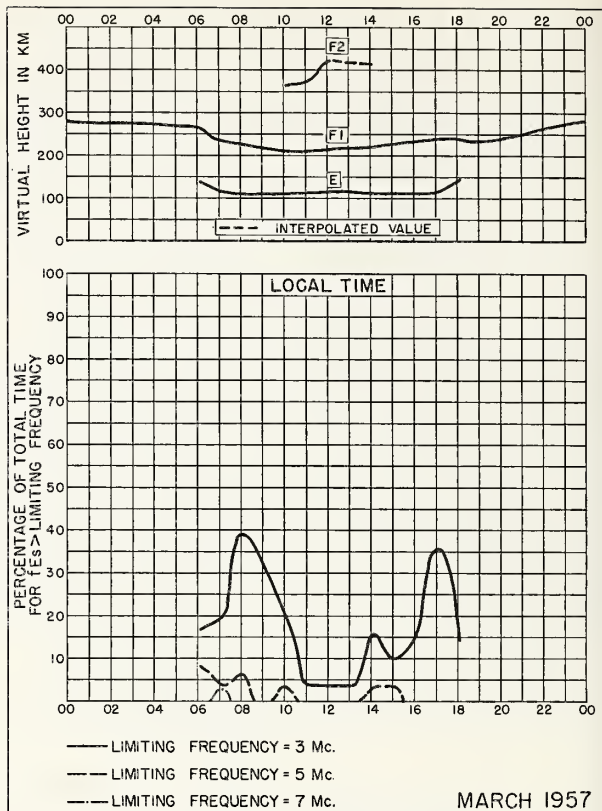


Fig. 46. FT. MONMOUTH, NEW JERSEY  
MARCH 1957

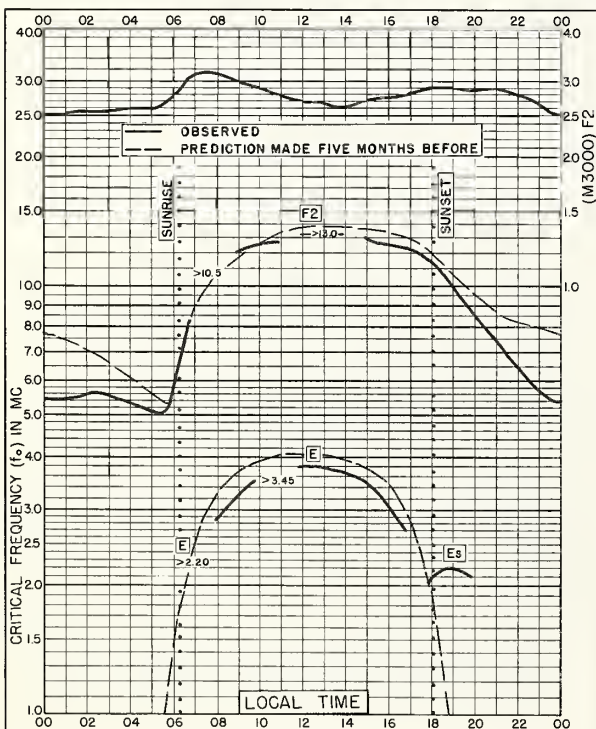


Fig. 47. SAN FRANCISCO, CALIFORNIA  
37.4°N, 122.2°W  
MARCH 1957

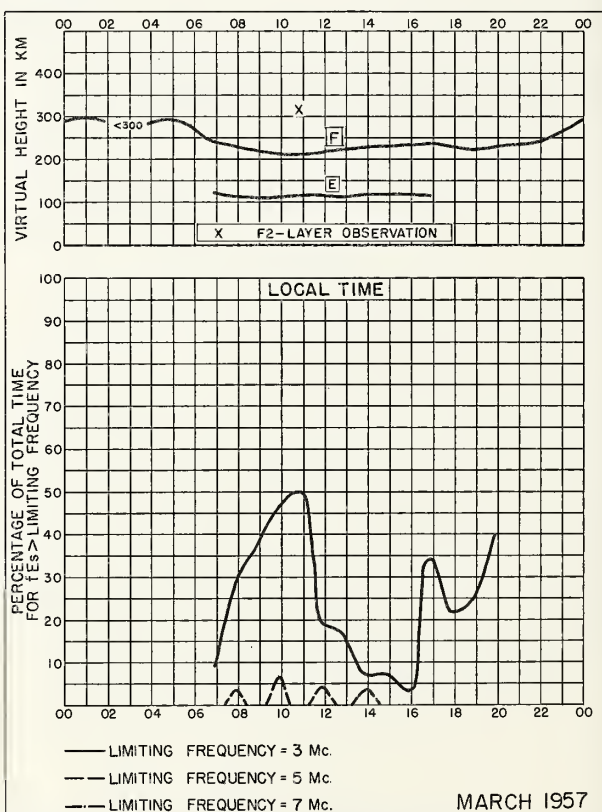


Fig. 48. SAN FRANCISCO, CALIFORNIA  
MARCH 1957



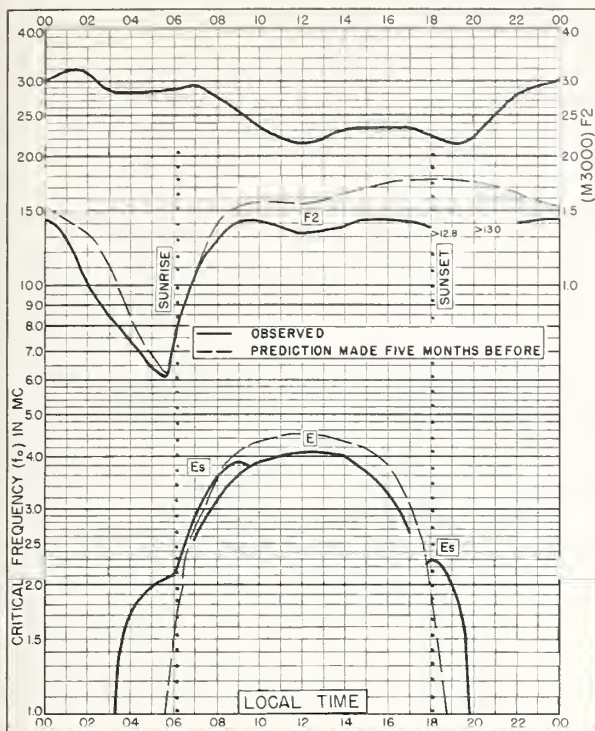


Fig. 49. BAGUIO, P.I.  
16.4°N, 120.6°E MARCH 1957

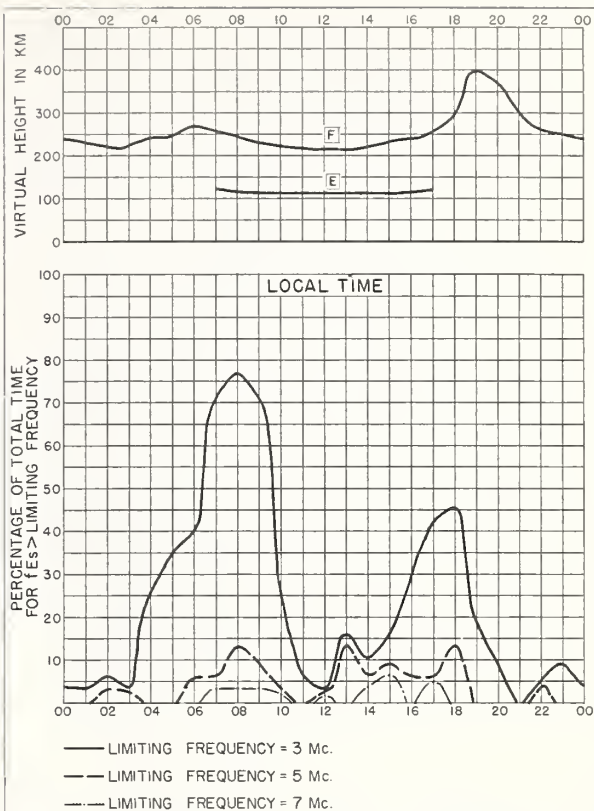


Fig. 50. BAGUIO, P.I. MARCH 1957

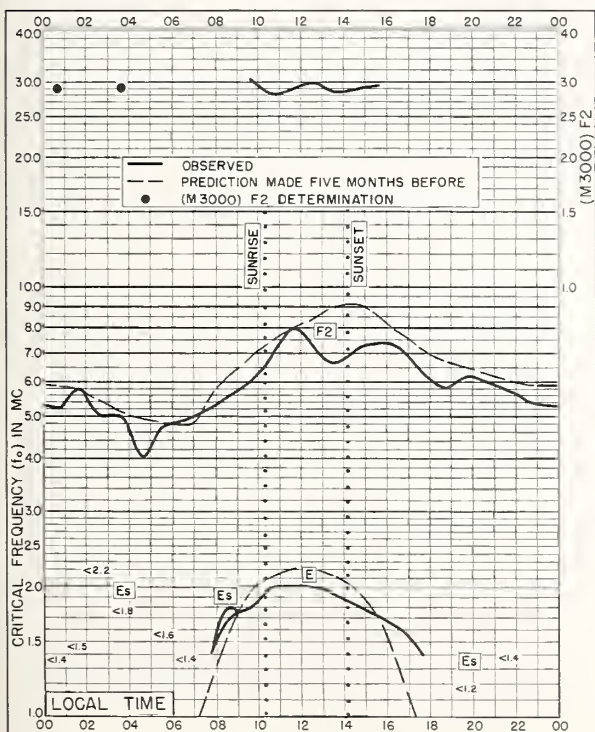


Fig. 51. RESOLUTE BAY, CANADA  
74.7°N, 94.9°W FEBRUARY 1957

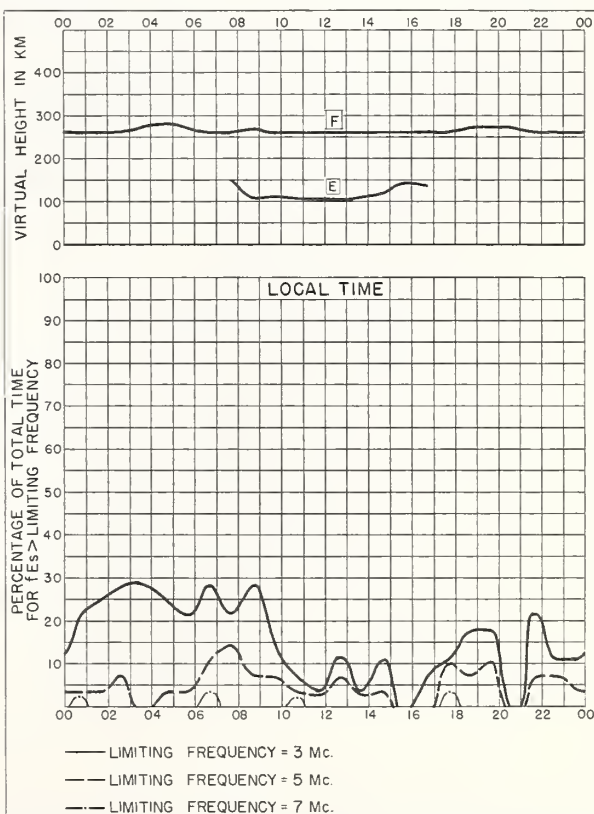


Fig. 52. RESOLUTE BAY, CANADA FEBRUARY 1957

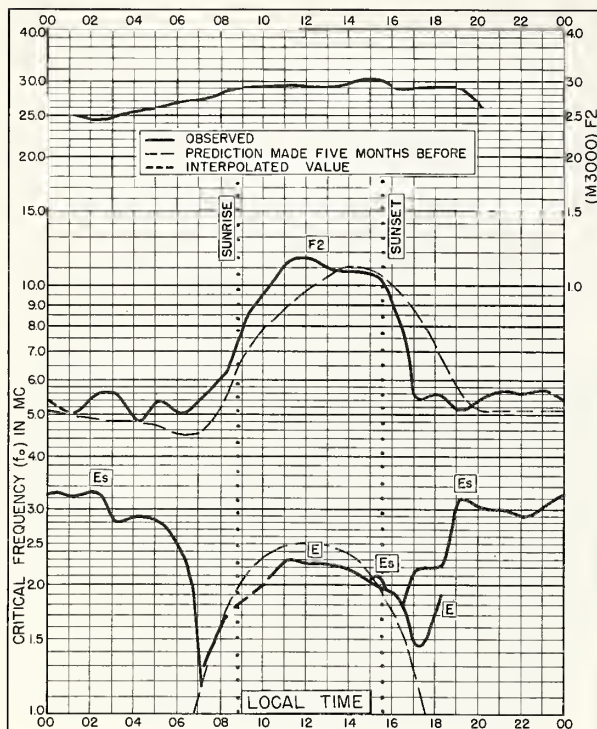


Fig. 53. TROMSØ, NORWAY  
69.7°N, 19.0°E

FEBRUARY 1957

NBS 503

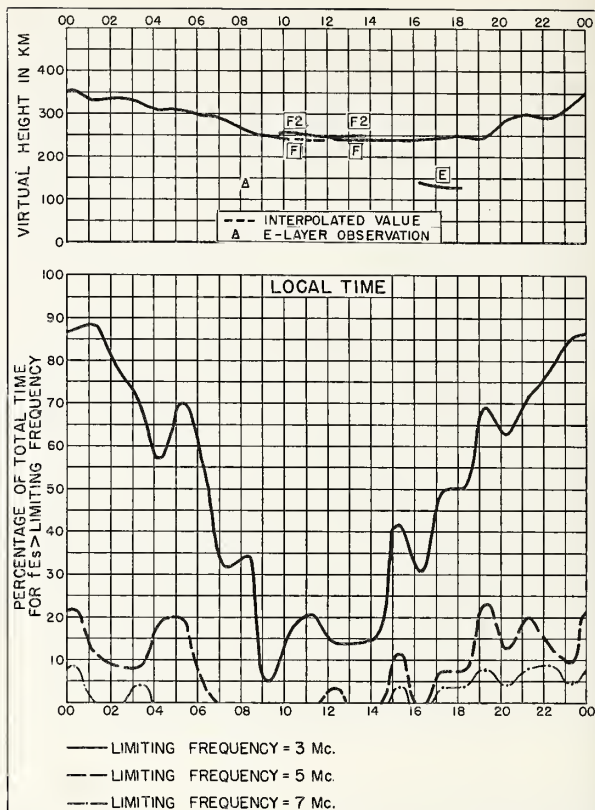


Fig. 54. TROMSØ, NORWAY

FEBRUARY 1957

NBS 490

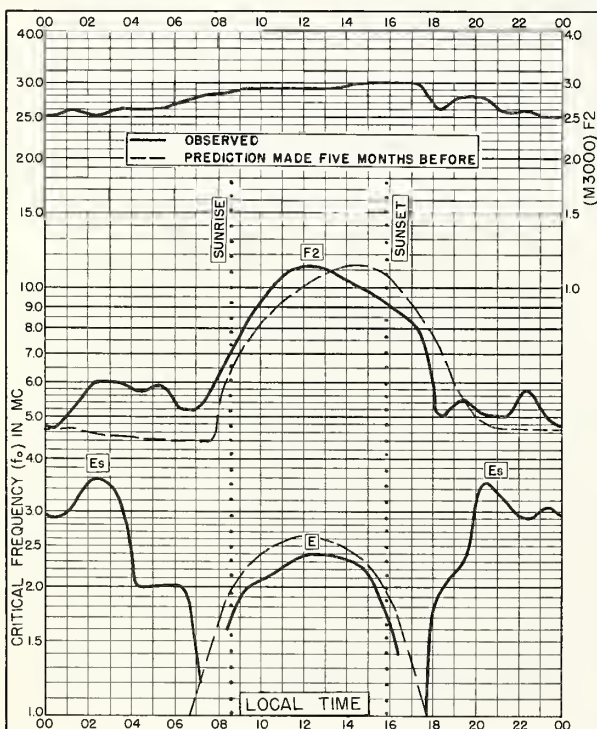


Fig. 55. KIRUNA, SWEDEN  
67.8°N, 20.3°E

FEBRUARY 1957

NBS 503

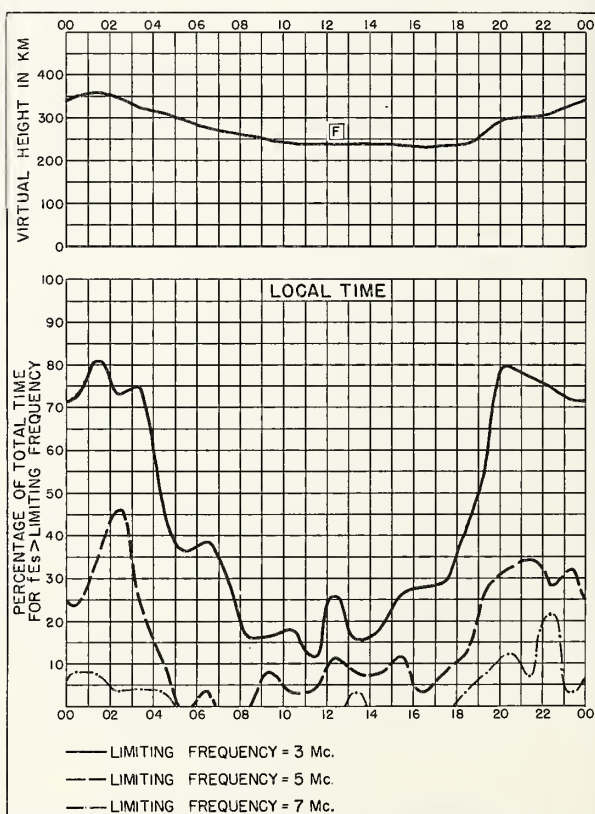


Fig. 56. KIRUNA, SWEDEN

FEBRUARY 1957

NBS 490



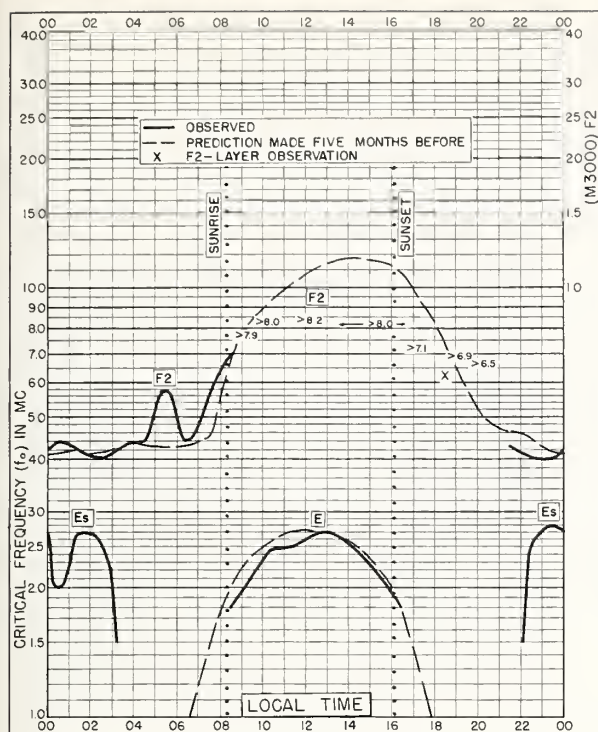


Fig. 57. LULEA, SWEDEN

65.6°N, 22.1°E

FEBRUARY 1957

NBS 503

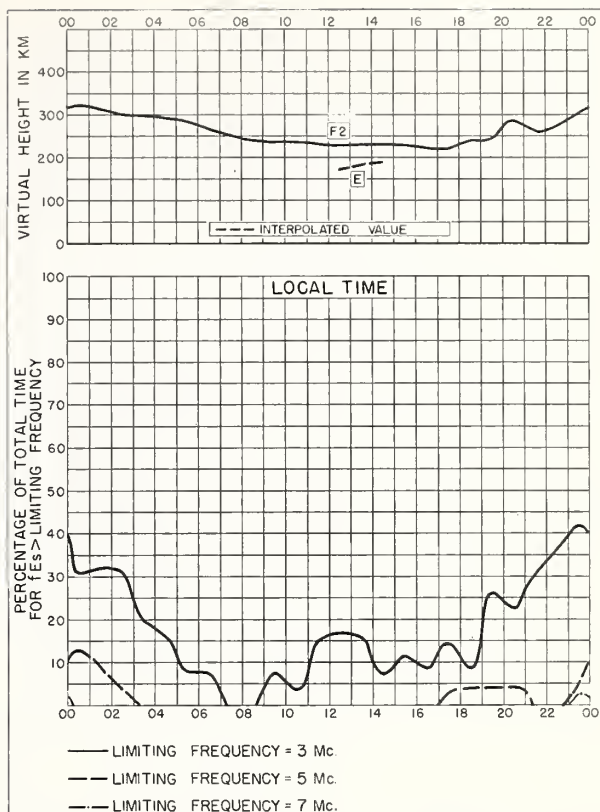


Fig. 58. LULEA, SWEDEN

FEBRUARY 1957

NBS 490

N. &amp; S. INTERNATIONAL PHYSICAL SYMPOSIUM 310777

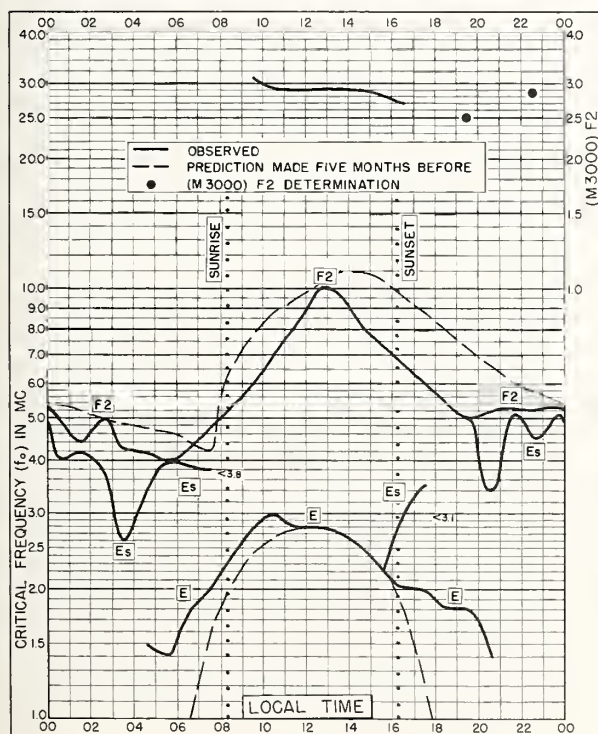


Fig. 59. BAKER LAKE, CANADA

64.3°N, 96.0°W

FEBRUARY 1957

NBS 503

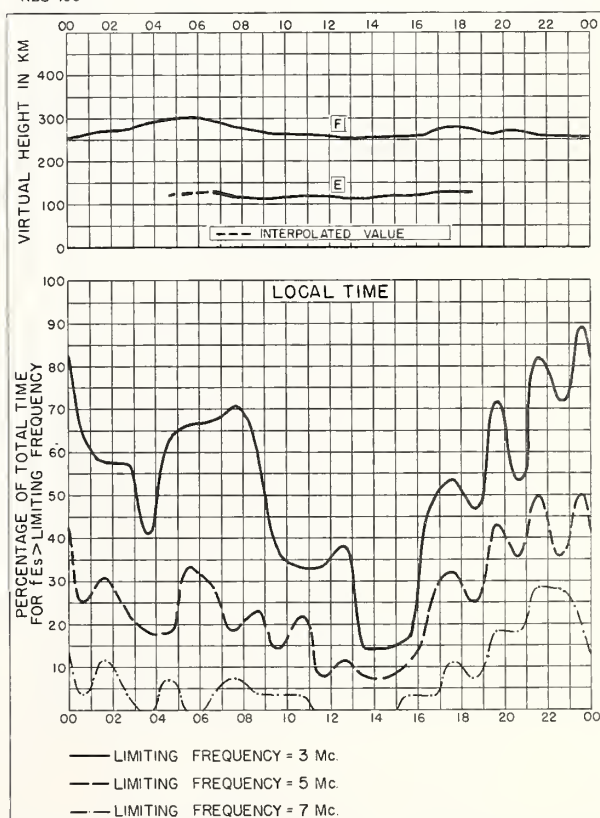
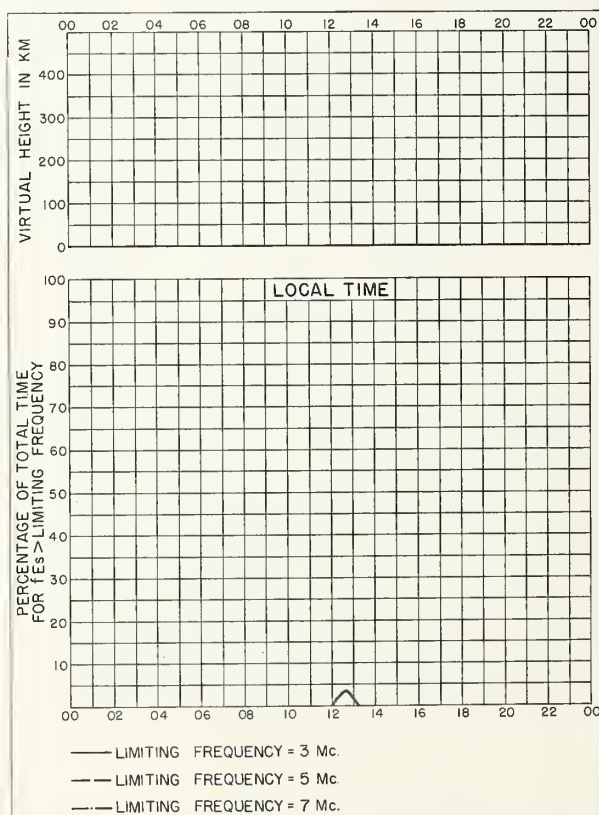
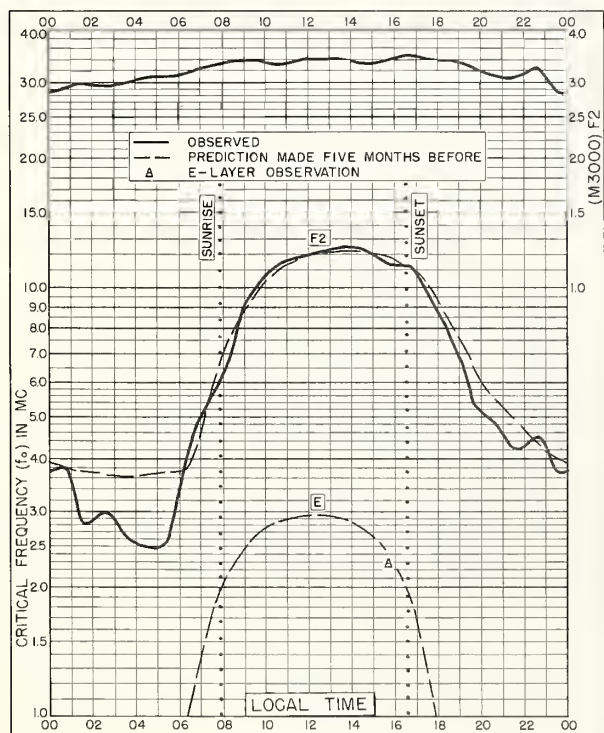
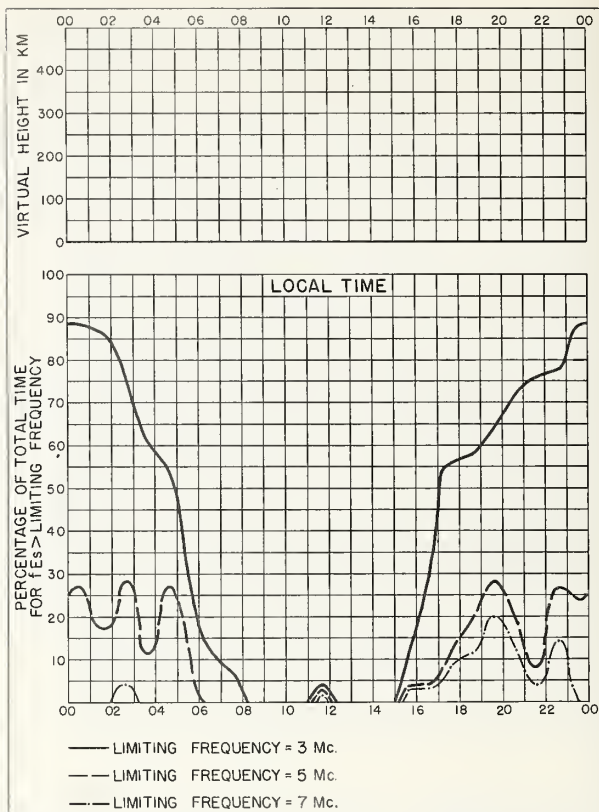
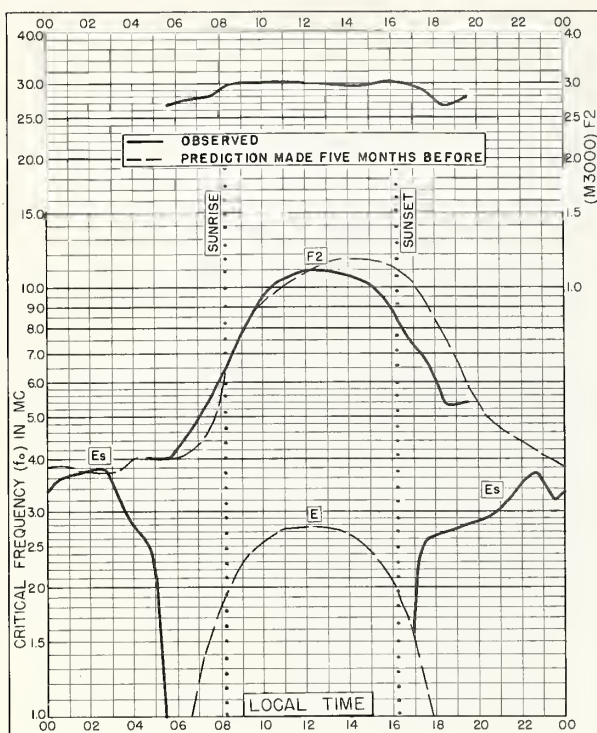


Fig. 60. BAKER LAKE, CANADA FEBRUARY 1957

NBS 490

N. &amp; S. INTERNATIONAL PHYSICAL SYMPOSIUM 310777





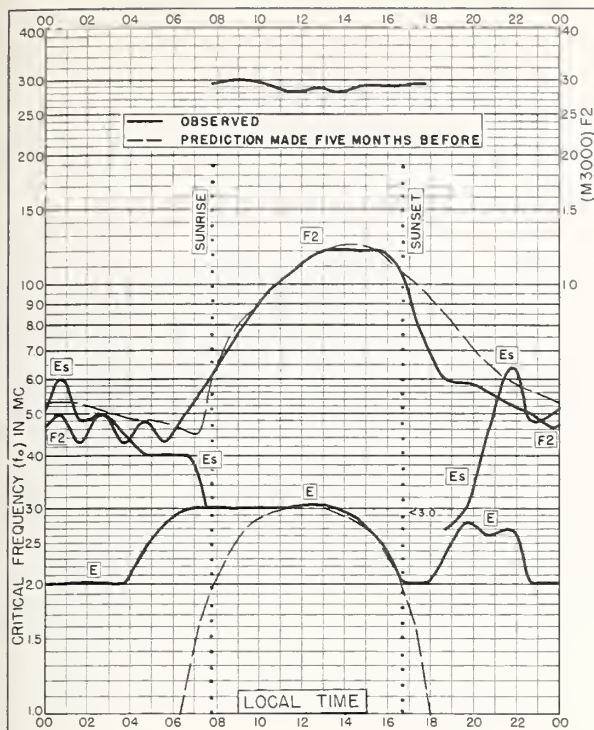


Fig. 65. CHURCHILL, CANADA  
58.8°N, 94.2°W FEBRUARY 1957

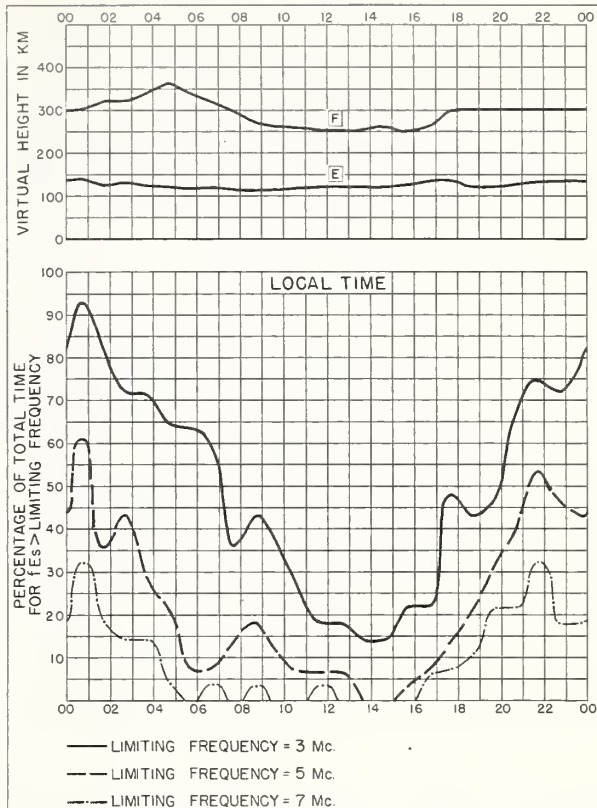


Fig. 66. CHURCHILL, CANADA FEBRUARY 1957

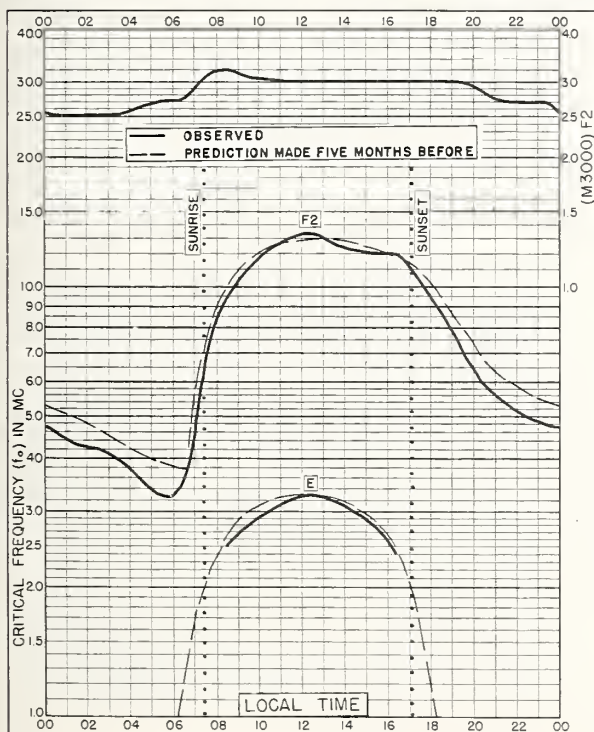


Fig. 67. De BILT, HOLLAND  
52.1°N, 5.2°E FEBRUARY 1957

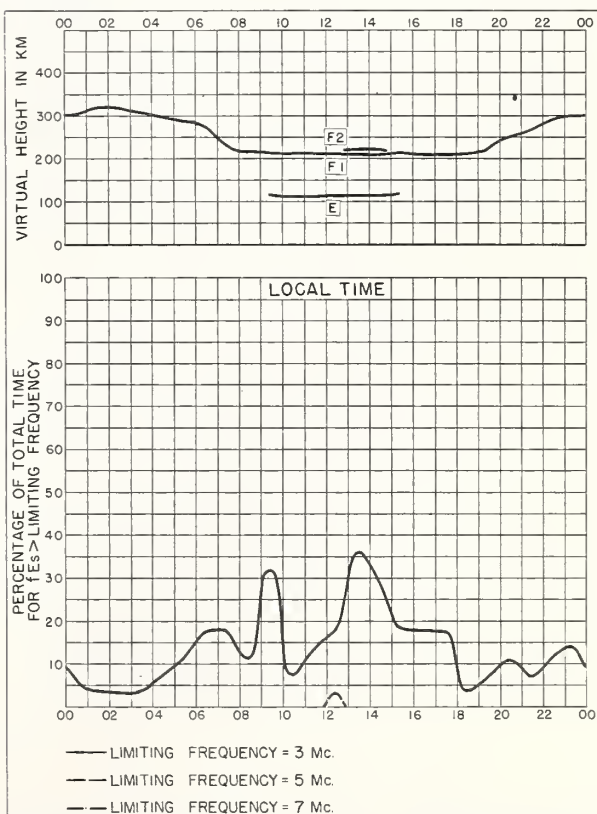
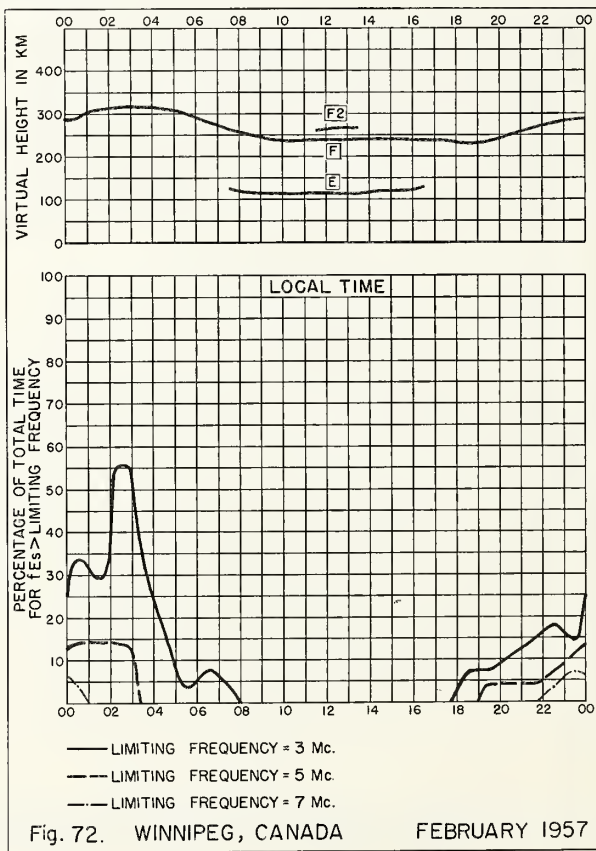
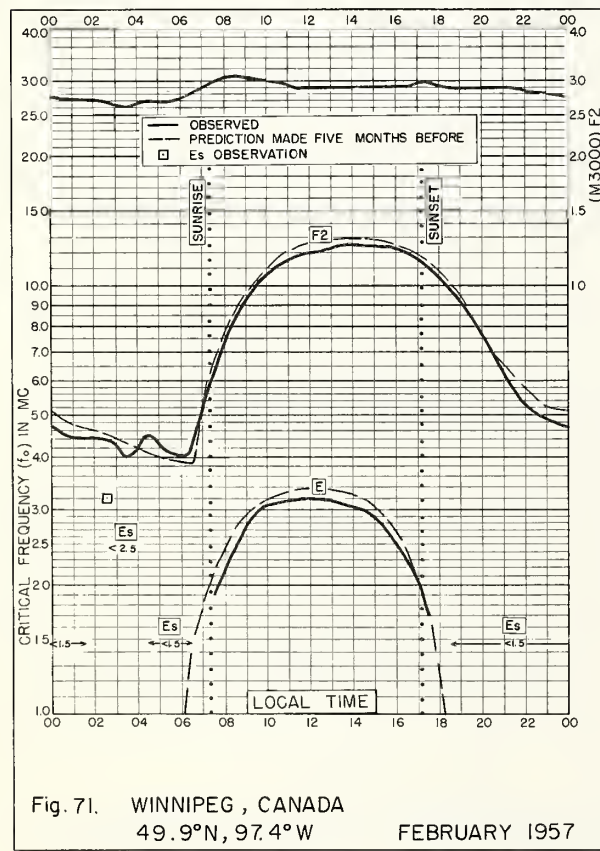
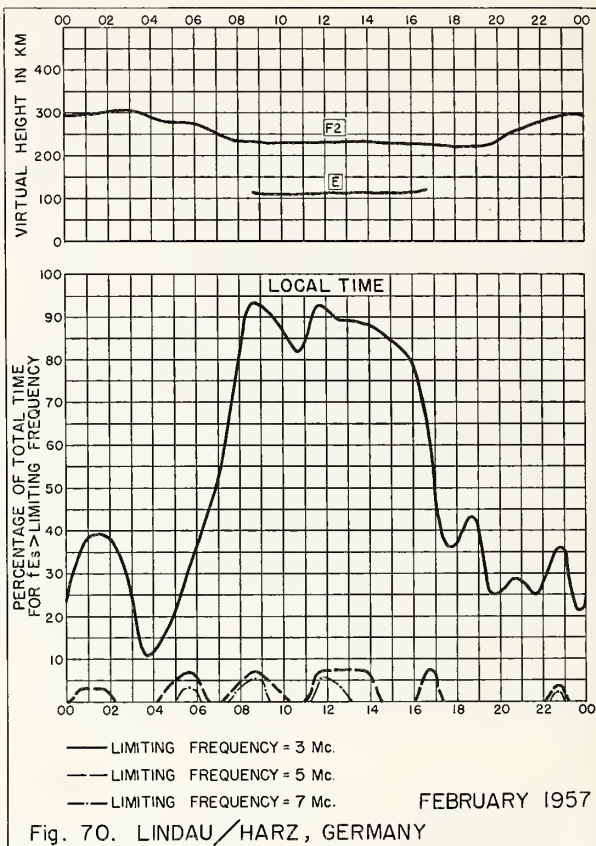
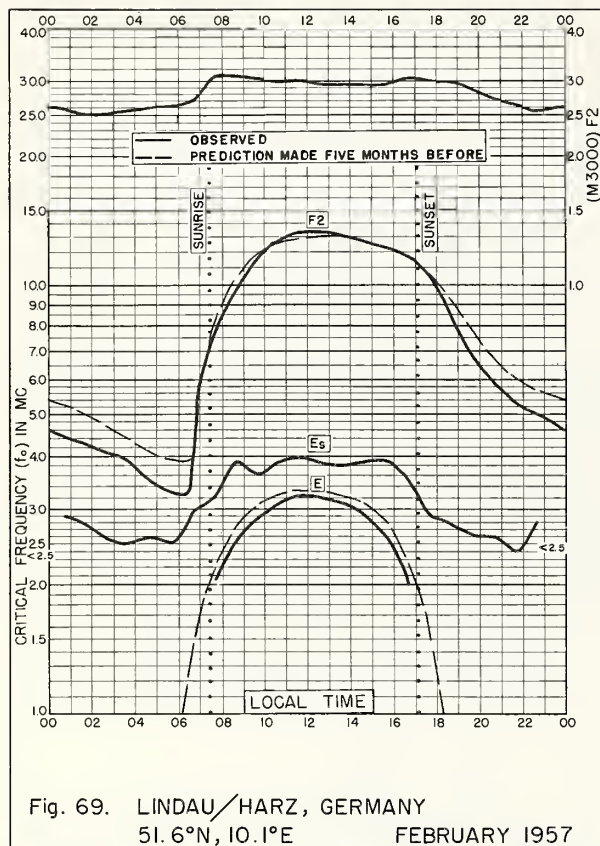


Fig. 68. De BILT, HOLLAND FEBRUARY 1957





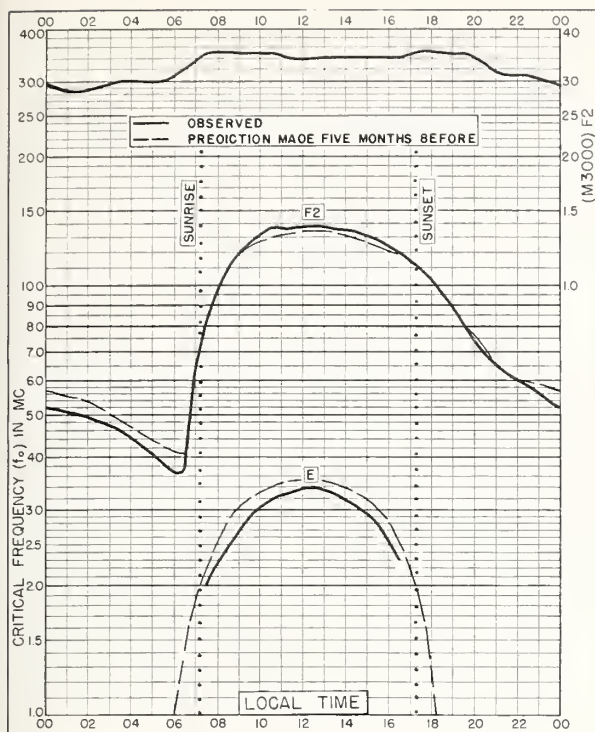


Fig. 73. SCHWARZENBURG, SWITZERLAND  
46.8°N, 7.3°E  
FEBRUARY 1957

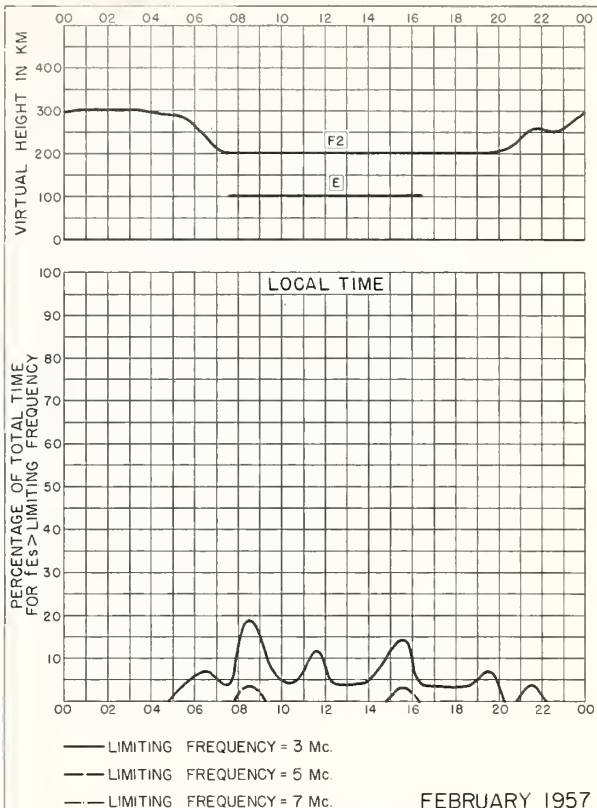


Fig. 74. SCHWARZENBURG, SWITZERLAND

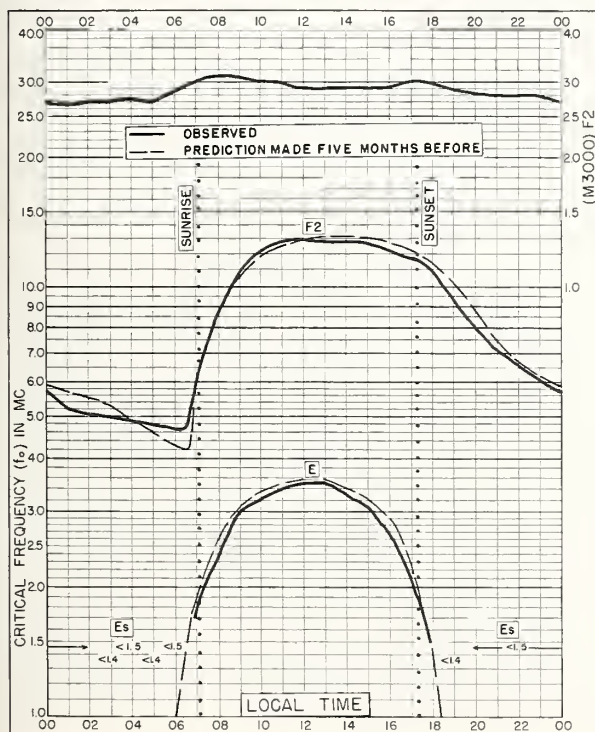


Fig. 75. OTTAWA, CANADA  
45.4°N, 75.9°W  
FEBRUARY 1957

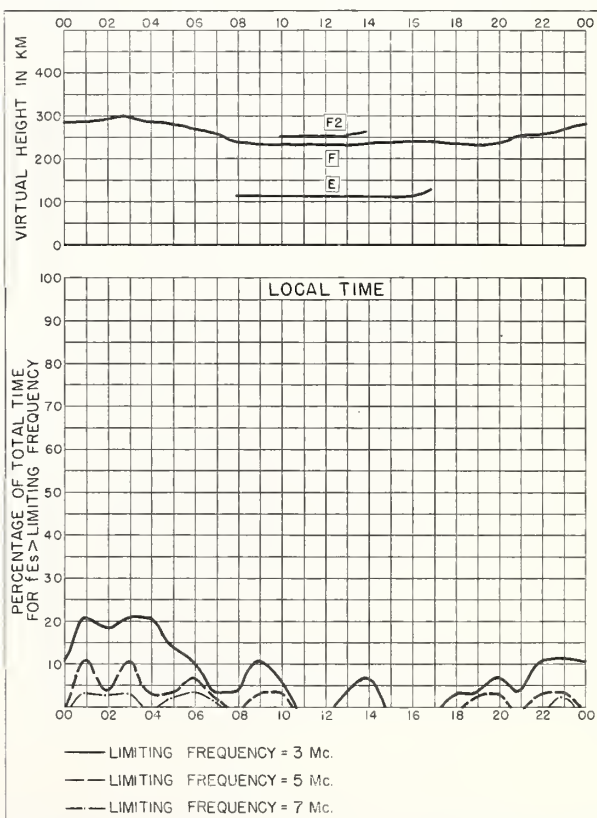


Fig. 76. OTTAWA, CANADA  
FEBRUARY 1957



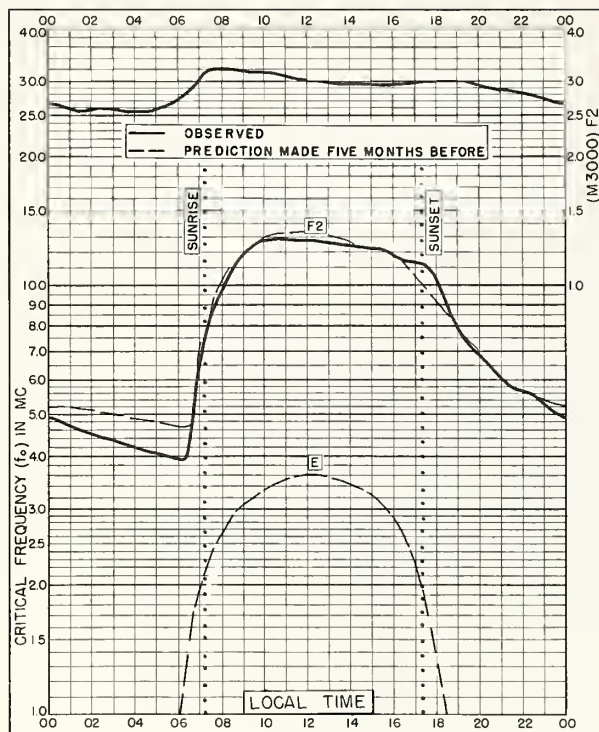


Fig. 77. WAKKANAI, JAPAN  
45.4°N, 141.7°E

FEBRUARY 1957

NBS 503

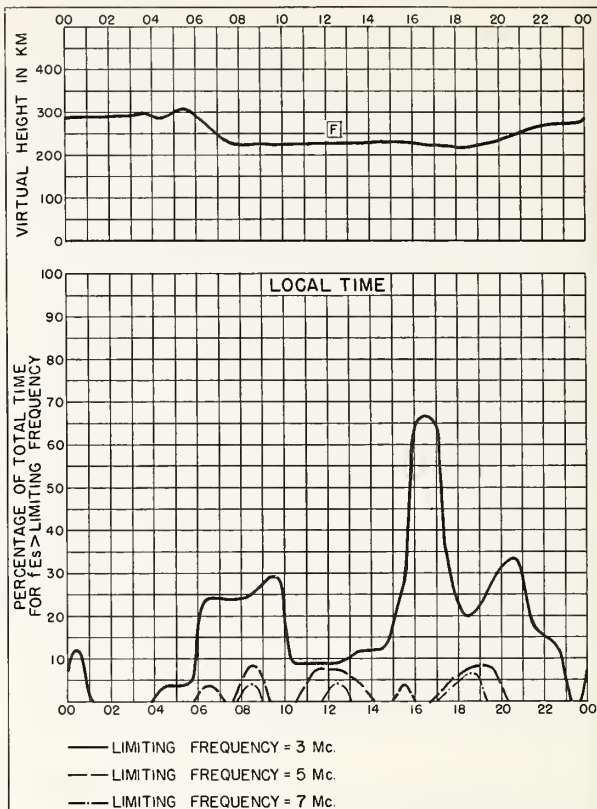


Fig. 78. WAKKANAI, JAPAN

FEBRUARY 1957

NBS 490

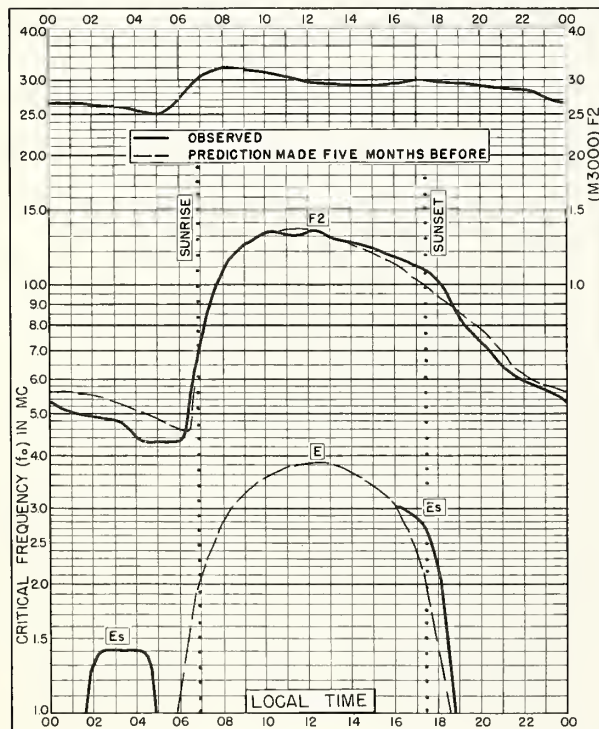


Fig. 79. AKITA, JAPAN  
39.7°N, 140.1°E

FEBRUARY 1957

NBS 503

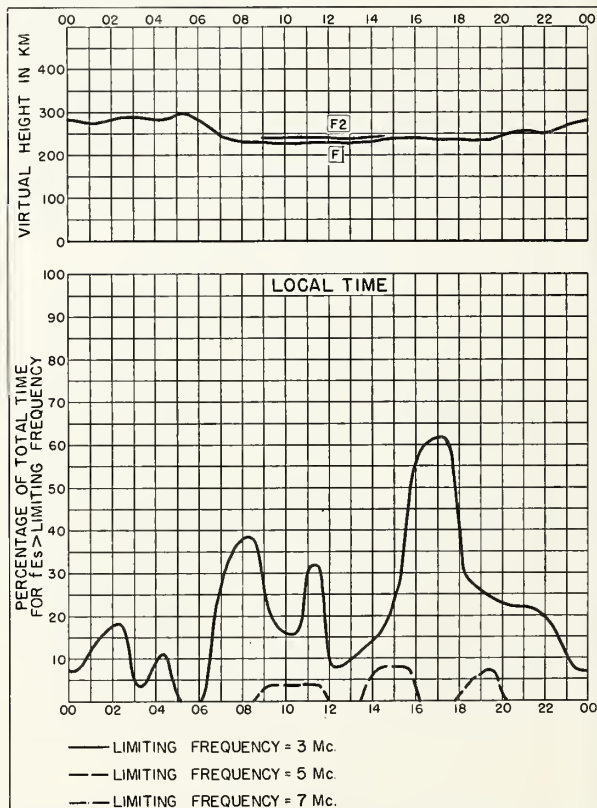


Fig. 80. AKITA, JAPAN

FEBRUARY 1957

NBS 490

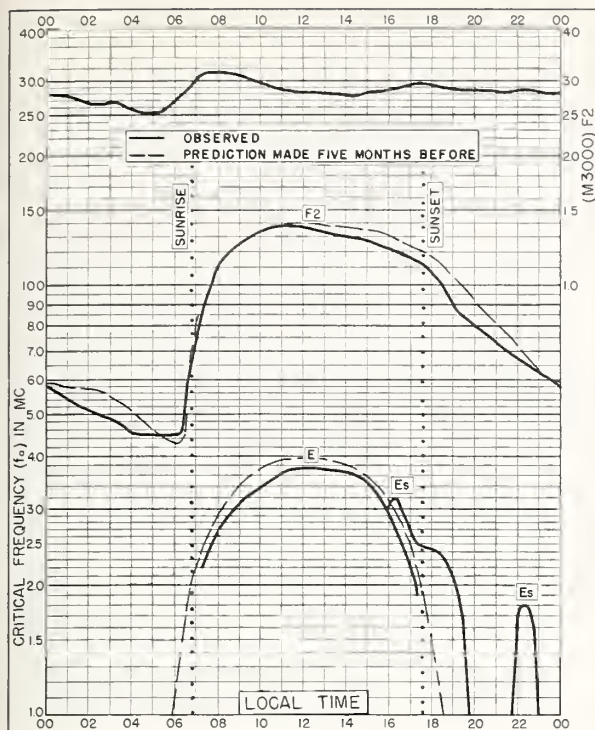


Fig. 81. TOKYO, JAPAN  
35.7°N, 139.5°E

FEBRUARY 1957

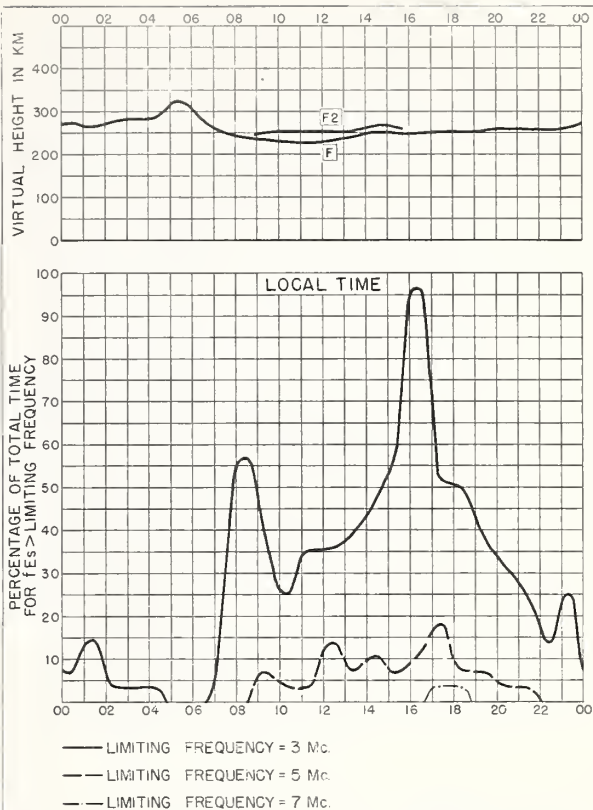


Fig. 82. TOKYO, JAPAN

FEBRUARY 1957

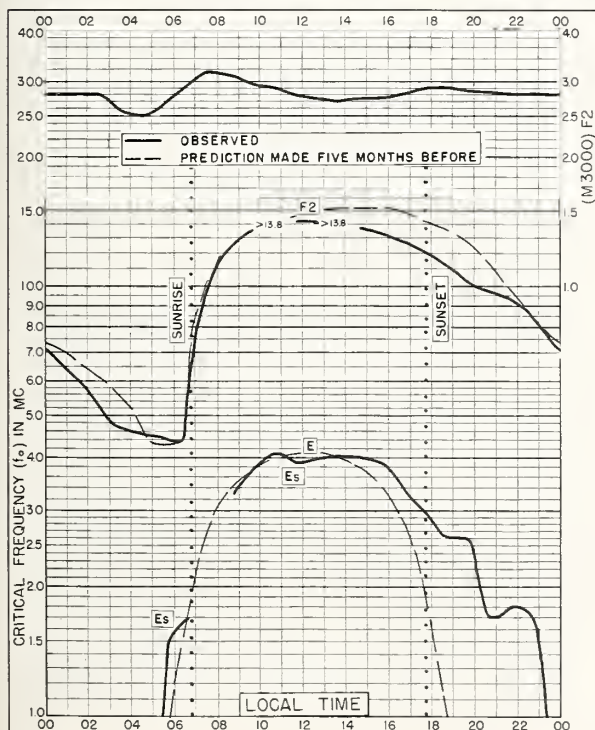


Fig. 83. YAMAGAWA, JAPAN  
31.2°N, 130.6°E

FEBRUARY 1957

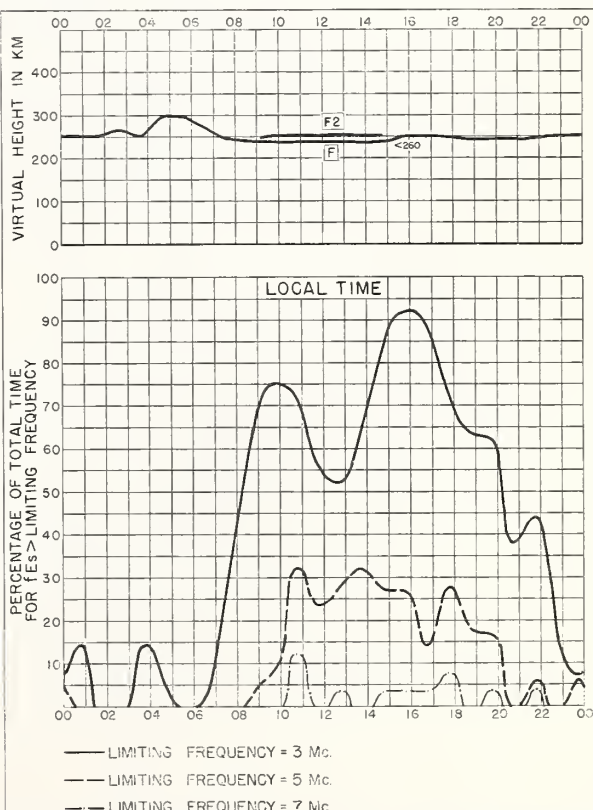


Fig. 84. YAMAGAWA, JAPAN

FEBRUARY 1957



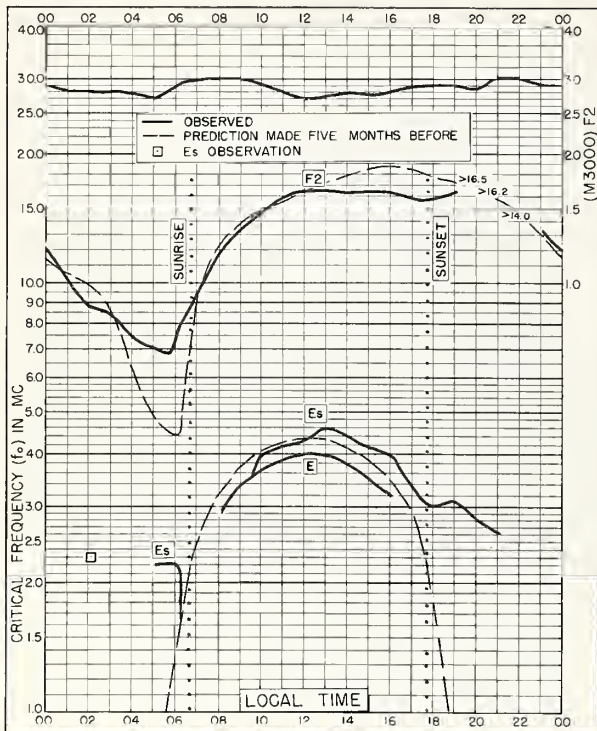


Fig. 85. FORMOSA, CHINA  
25.0°N, 121.5°E  
FEBRUARY 1957

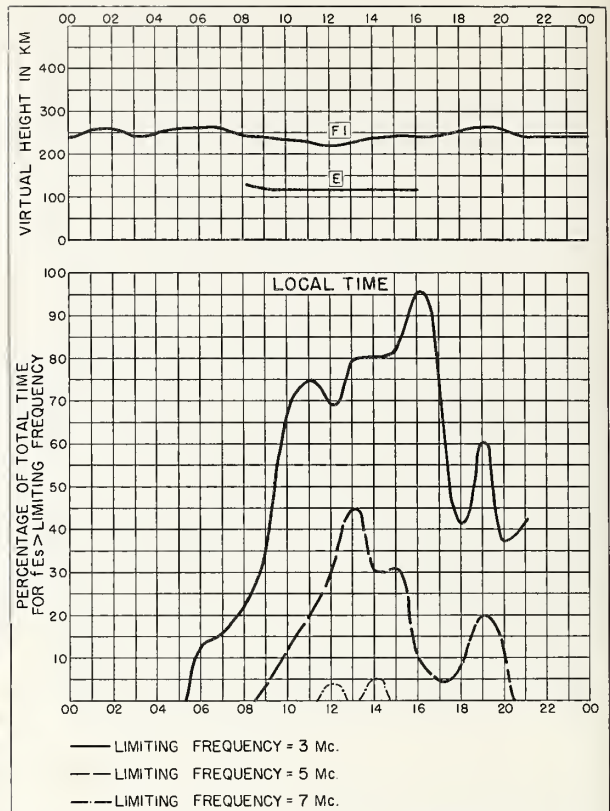


Fig. 86. FORMOSA, CHINA  
FEBRUARY 1957

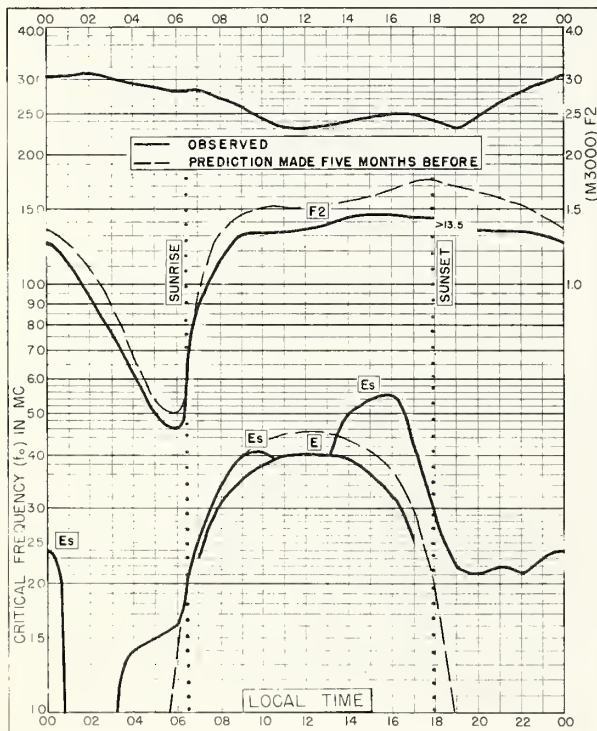


Fig. 87. BAGUIO, P. I.  
16.4°N, 120.6°E  
FEBRUARY 1957

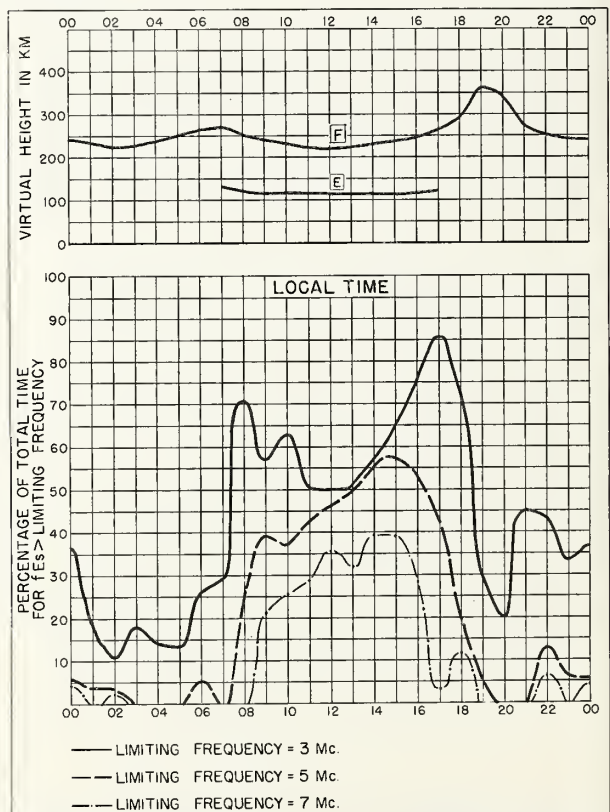


Fig. 88. BAGUIO, P. I.  
FEBRUARY 1957



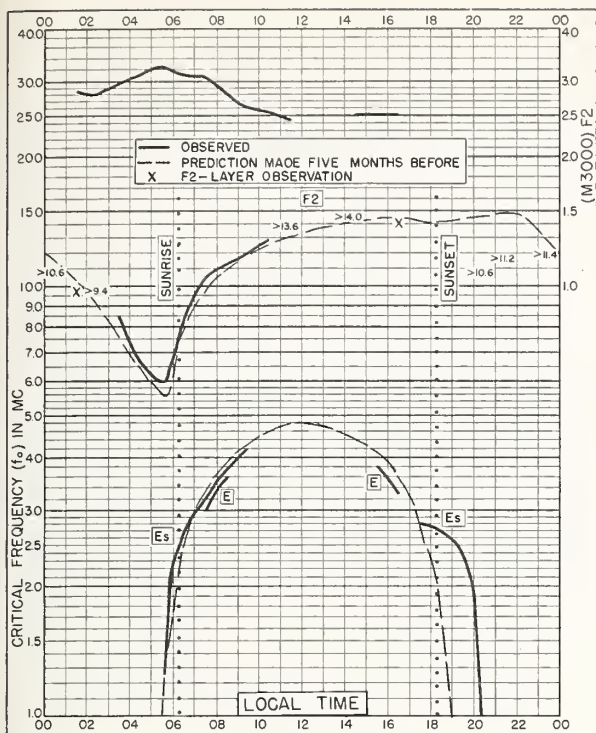


Fig. 89. NAIROBI, KENYA  
1.3°S, 36.8°E

FEBRUARY 1957

NBS 503

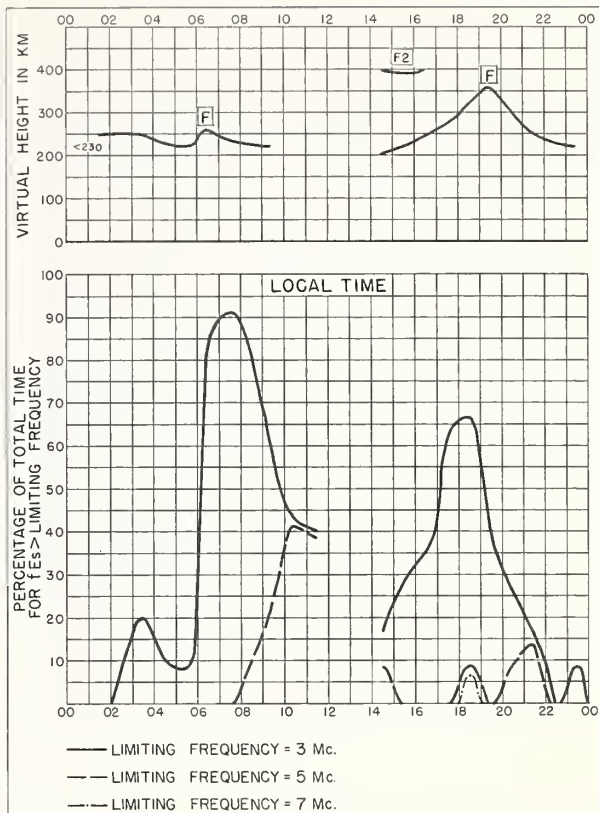


Fig. 90. NAIROBI, KENYA

FEBRUARY 1957

NBS 490

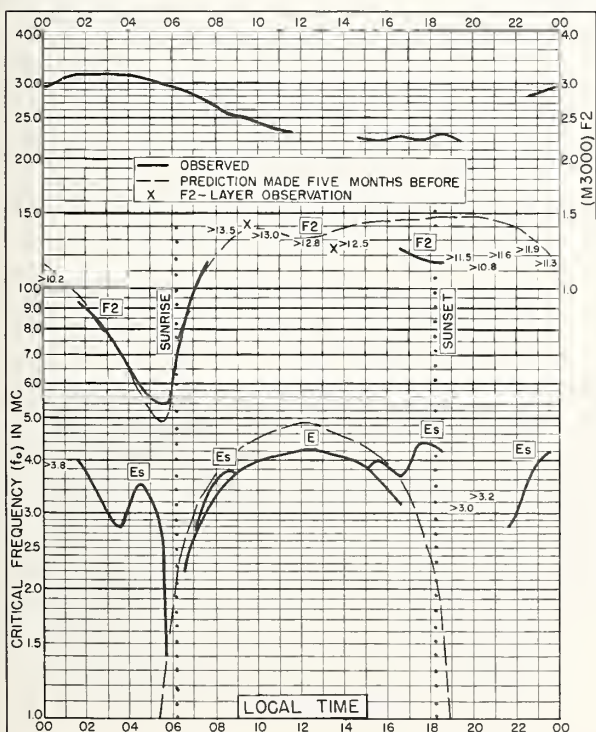


Fig. 91. TALARA, PERU  
4.6°S, 81.3°W

FEBRUARY 1957

NBS 503

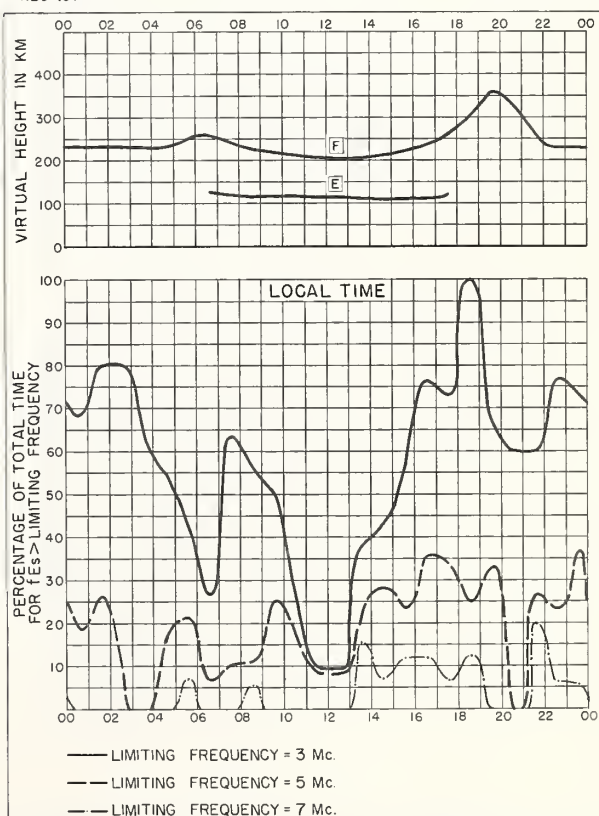
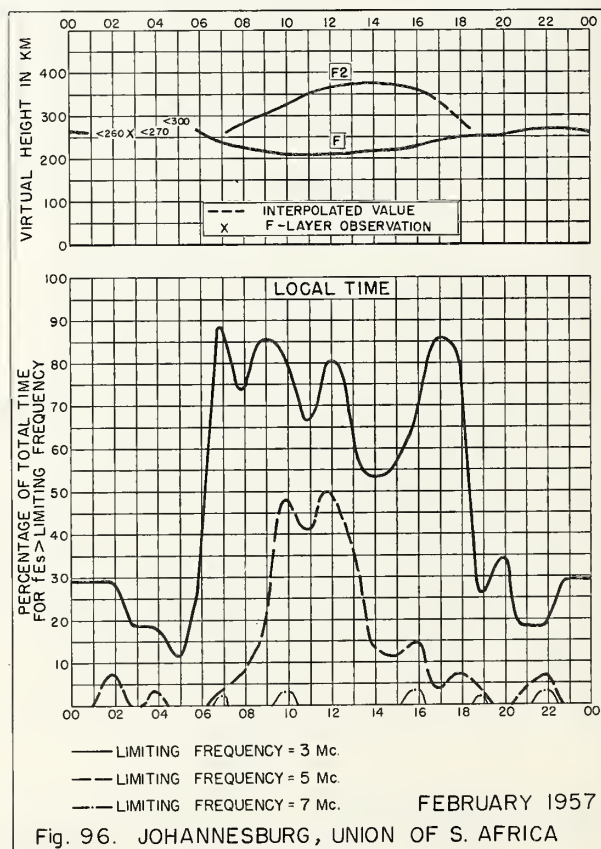
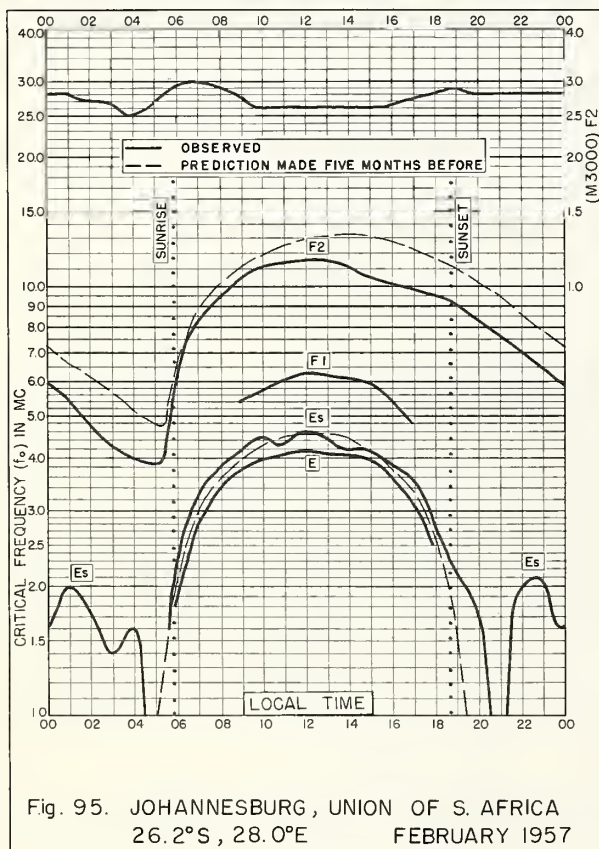
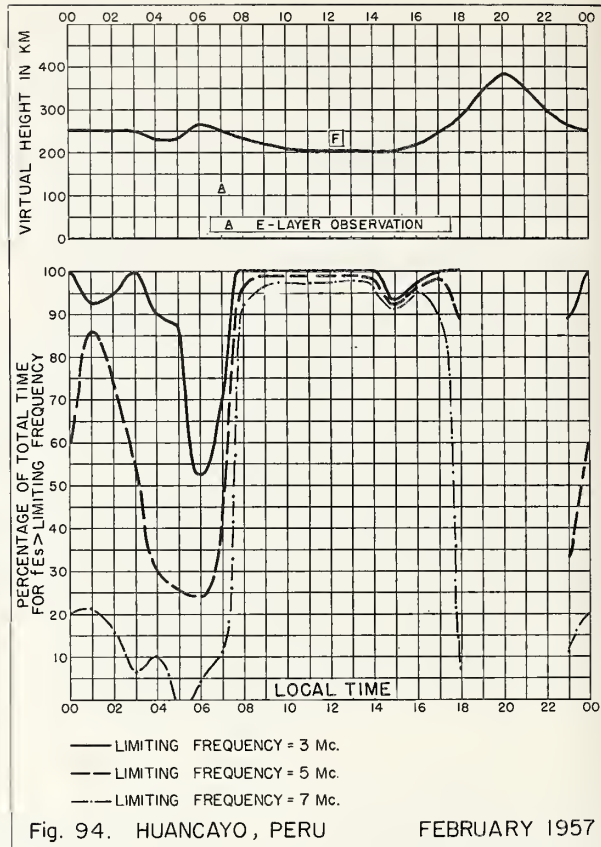
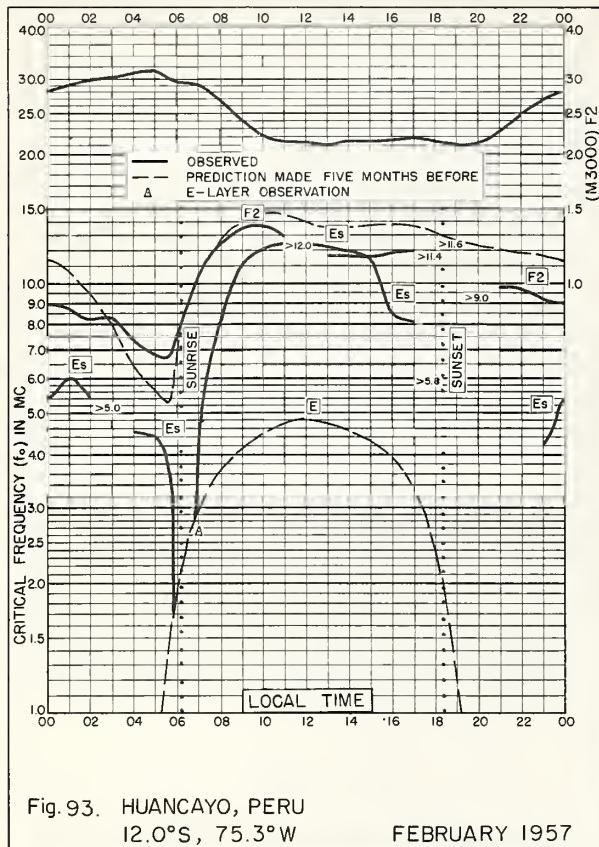


Fig. 92. TALARA, PERU

FEBRUARY 1957

NBS 490

NBS 490





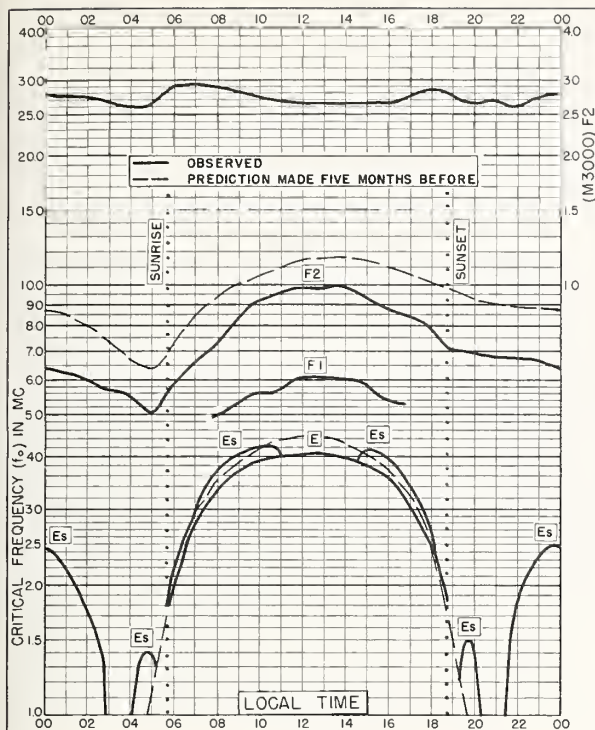


Fig. 97. WATHEROO, W. AUSTRALIA  
30.3°S, 115.9°E  
FEBRUARY 1957

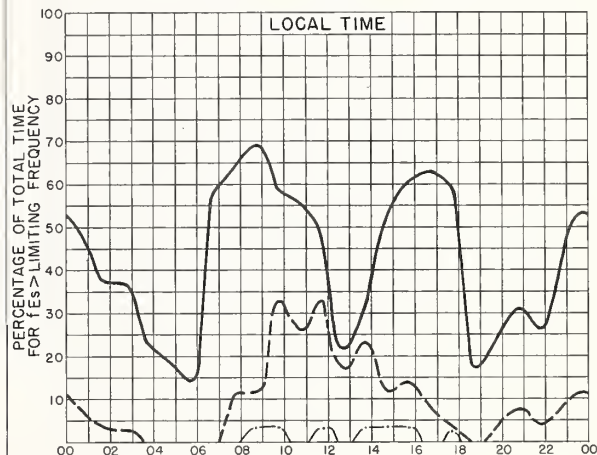
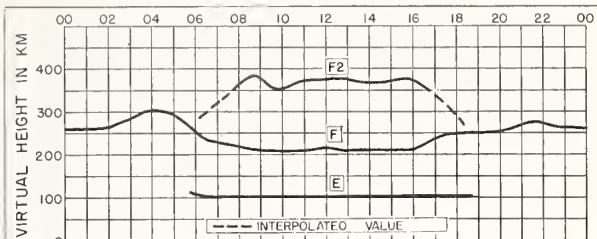


Fig. 98. WATHEROO, W. AUSTRALIA  
FEBRUARY 1957

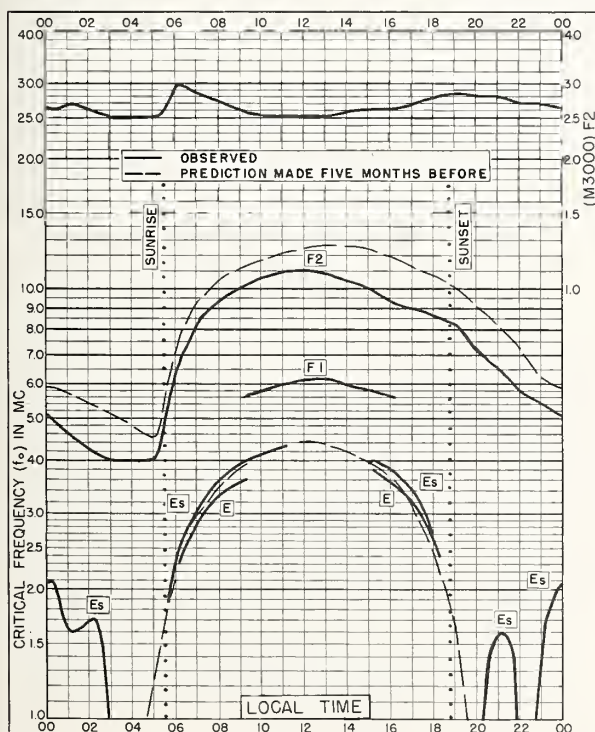


Fig. 99. CAPETOWN, UNION OF S. AFRICA  
34.1°S, 18.3°E  
FEBRUARY 1957

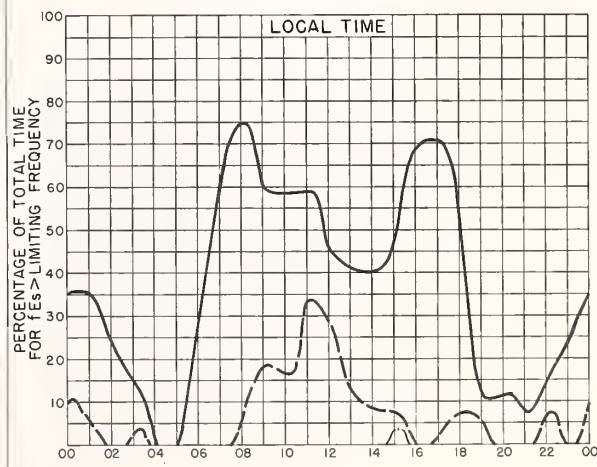
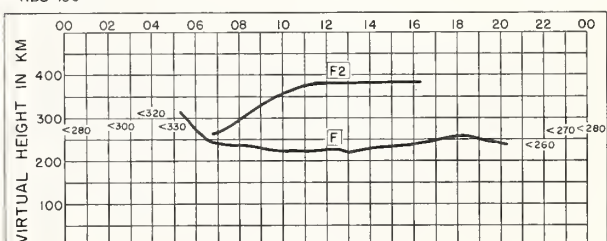
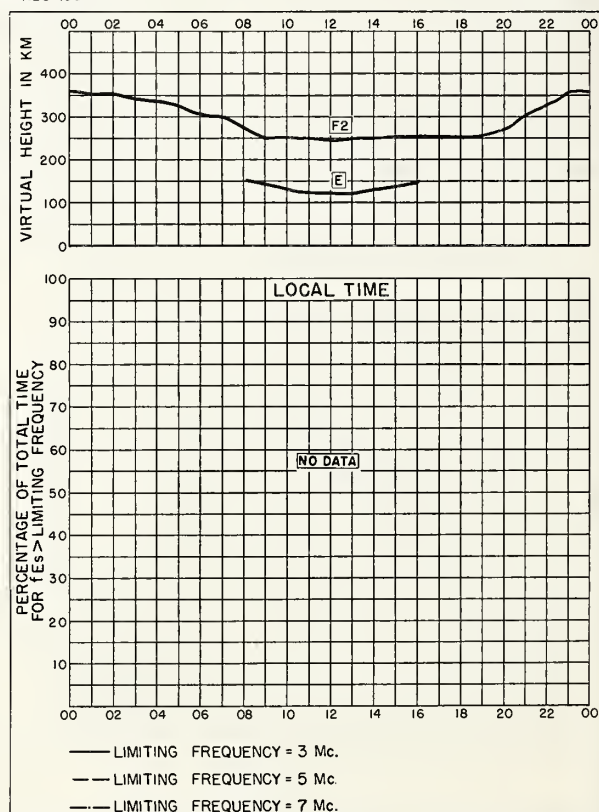
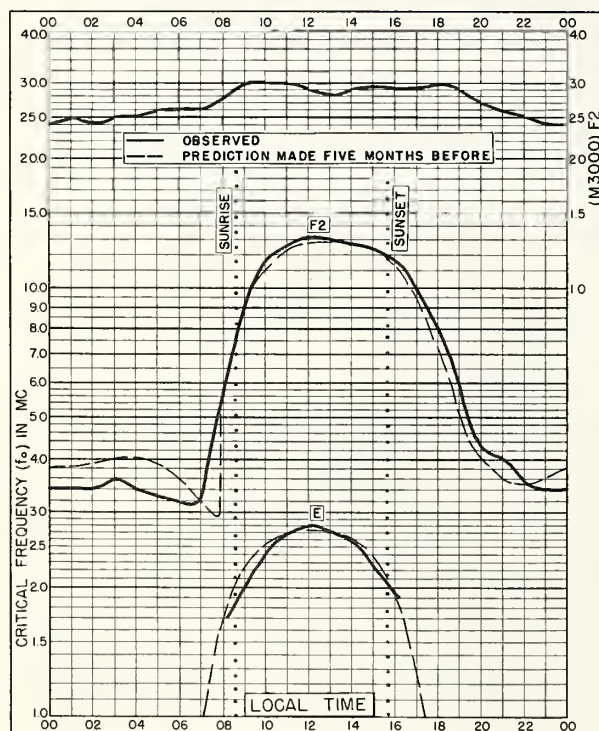
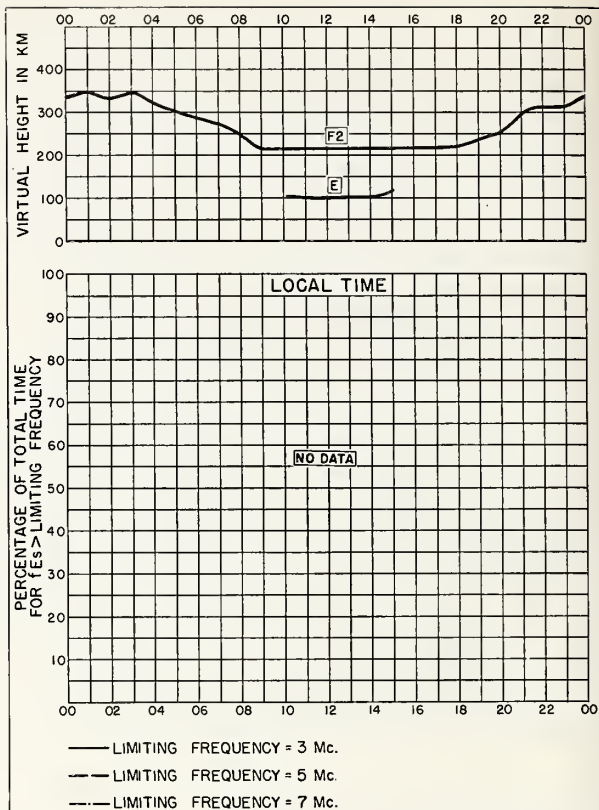
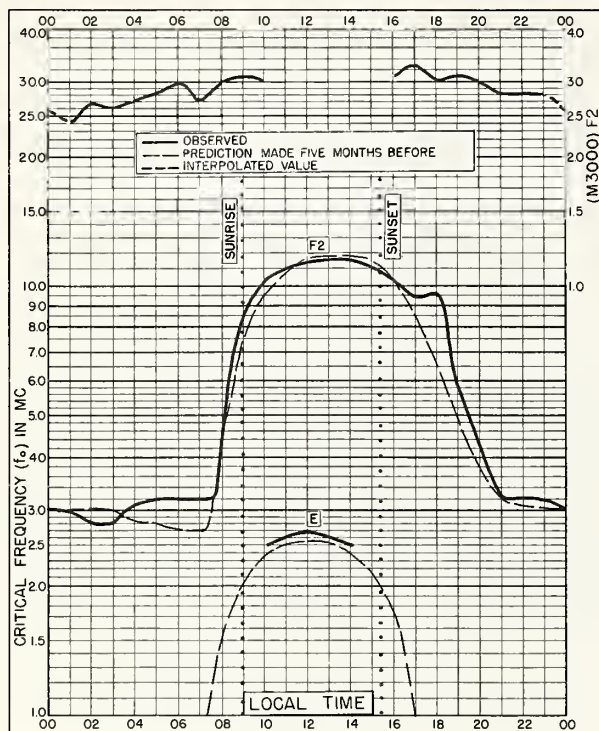


Fig. 100. CAPETOWN, UNION OF S. AFRICA  
FEBRUARY 1957





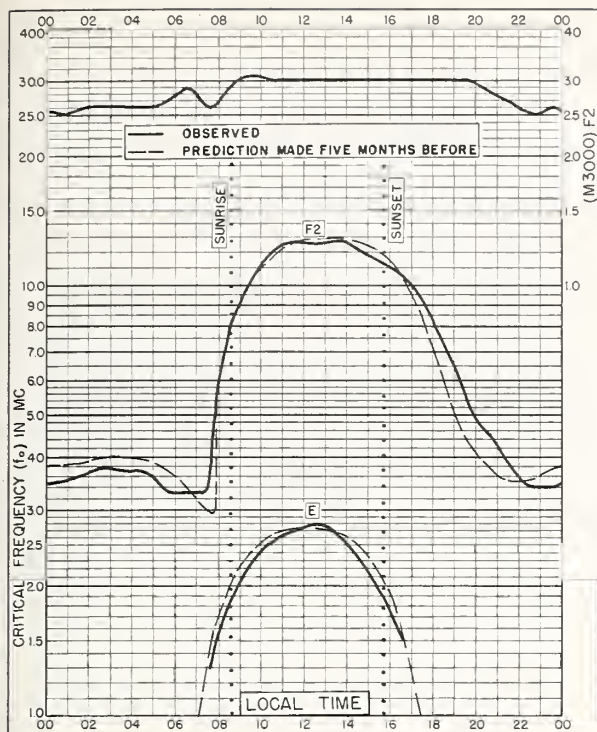


Fig. 105. TOMSK, U.S.S.R.  
56.5°N, 84.9°E

JANUARY 1957

NBS 503

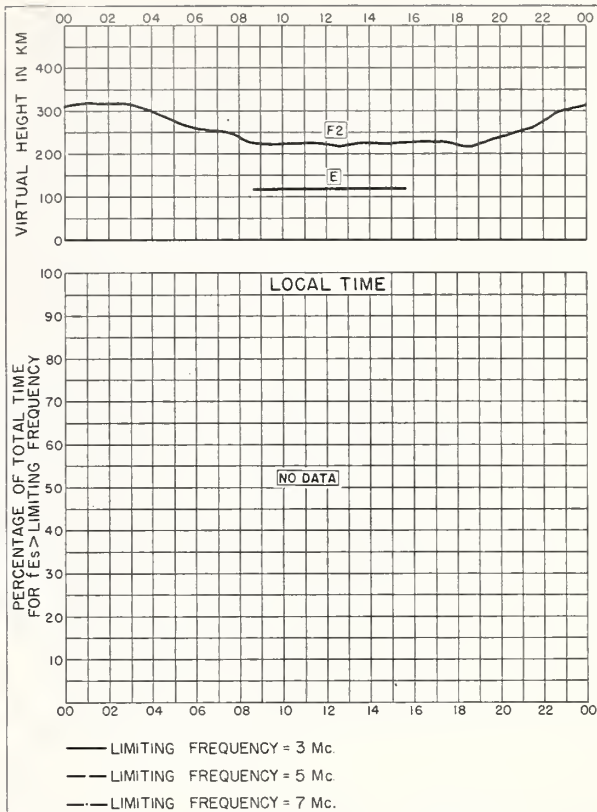


Fig. 106. TOMSK, U.S.S.R.

JANUARY 1957

NBS 490

A. N. INTERNATIONAL PHYSICAL SYMPOSIUM 1957

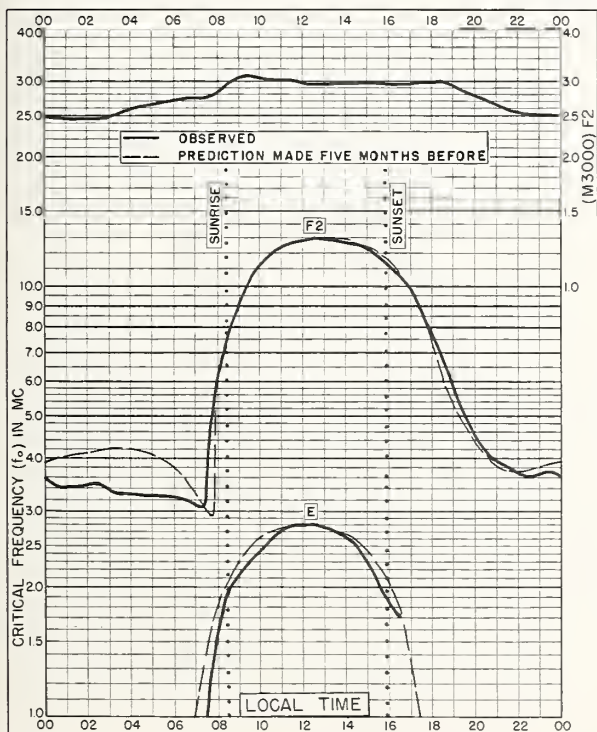


Fig. 107. MOSCOW, U.S.S.R.  
55.5°N, 37.3°E

JANUARY 1957

NBS 503

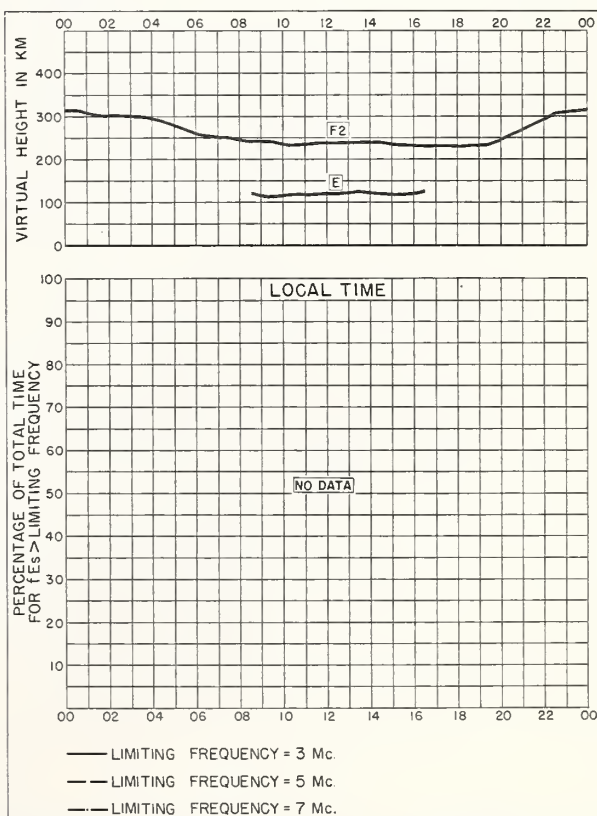


Fig. 108. MOSCOW, U.S.S.R.

JANUARY 1957

NBS 490

A. N. INTERNATIONAL PHYSICAL SYMPOSIUM 1957



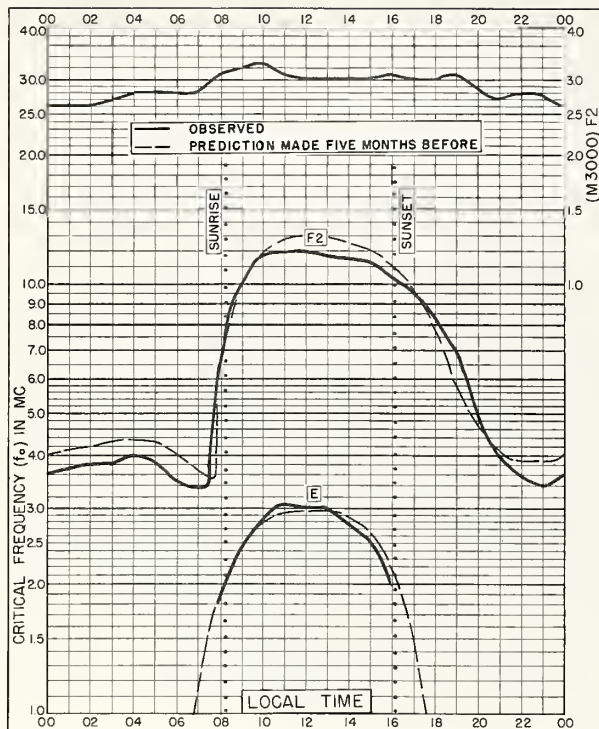


Fig. 109. IRKUTSK, U.S.S.R.  
52.5°N, 104.0°E

JANUARY 1957

NBS 503

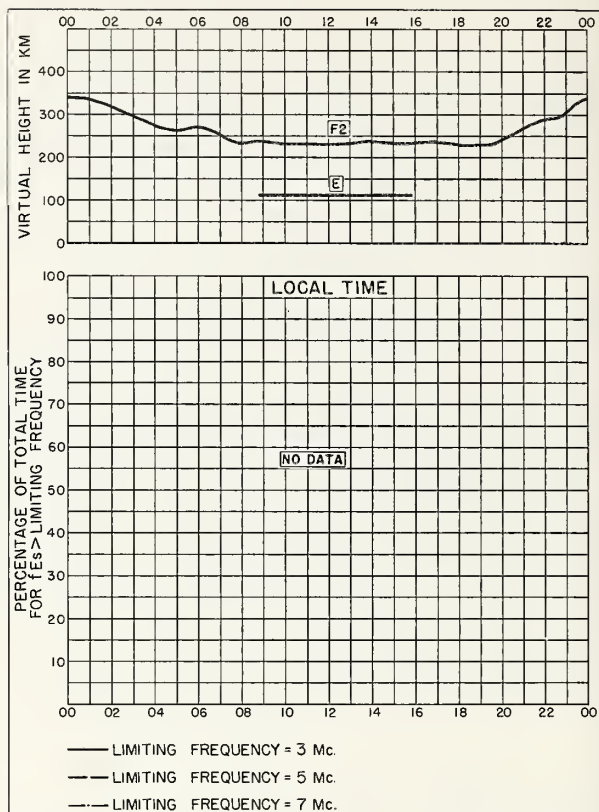


Fig. 110. IRKUTSK, U.S.S.R.

JANUARY 1957

NBS 490

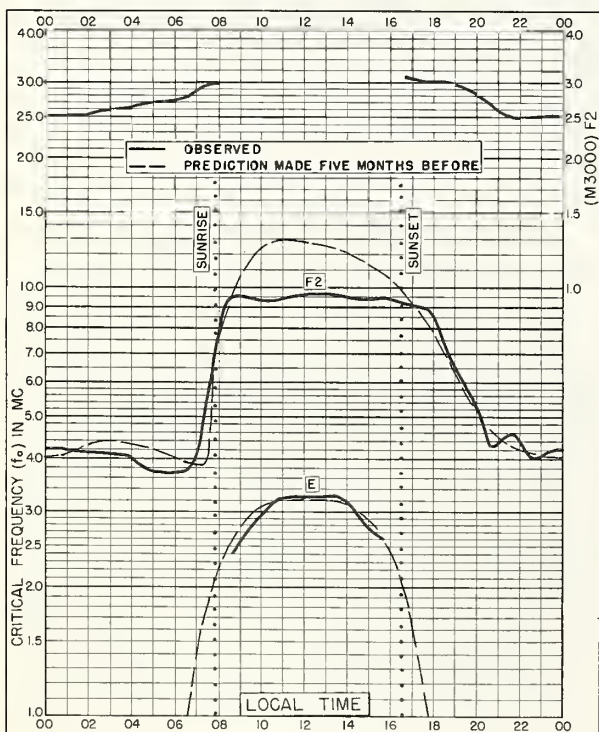


Fig. 111. ROSTOV-ON-DON, U.S.S.R.  
47.2°N, 39.7°E

JANUARY 1957

NBS 503

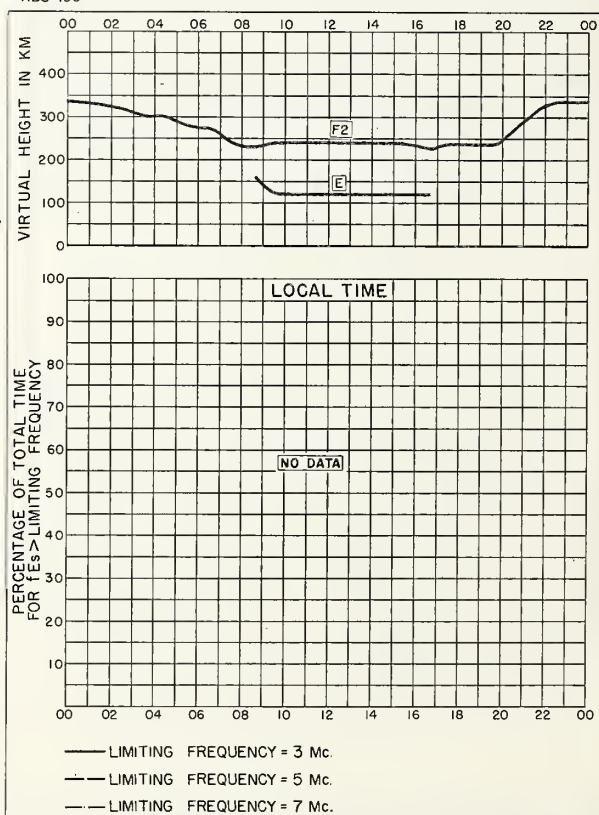
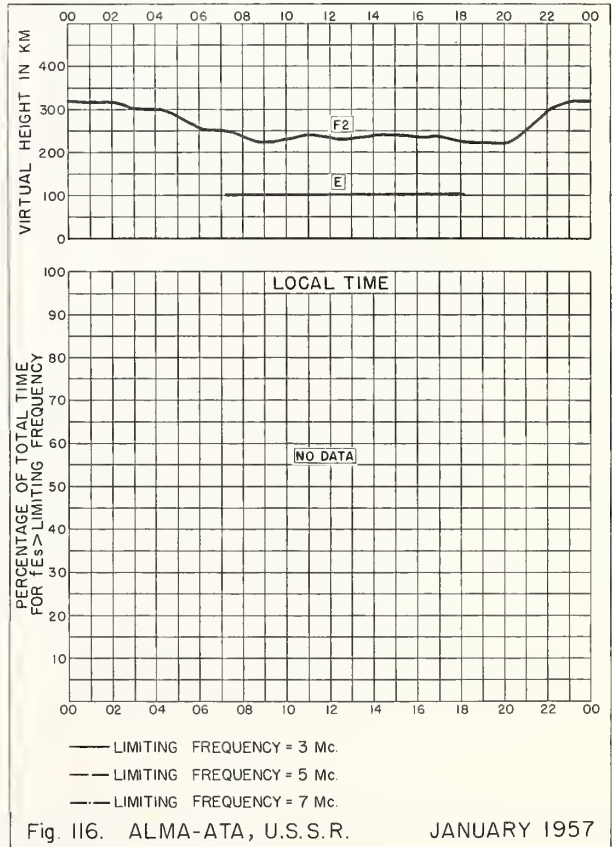
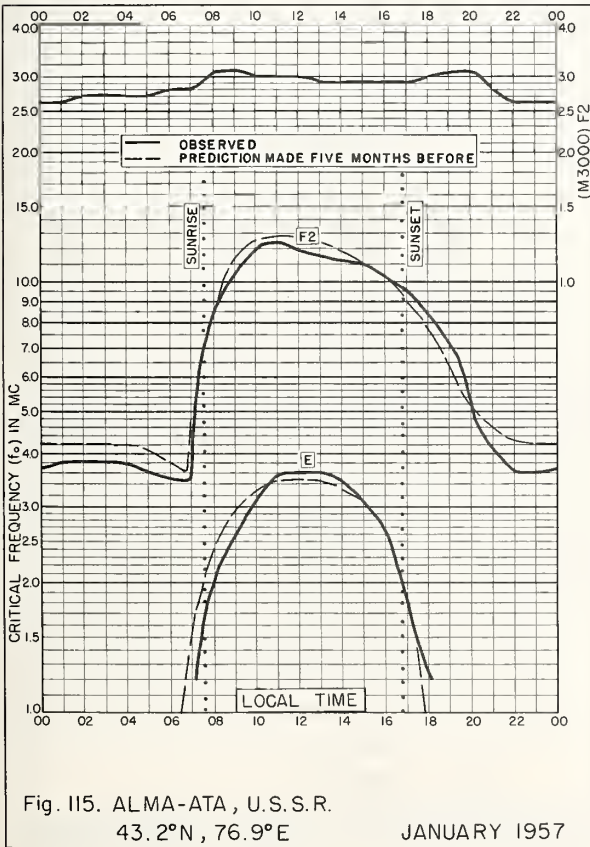
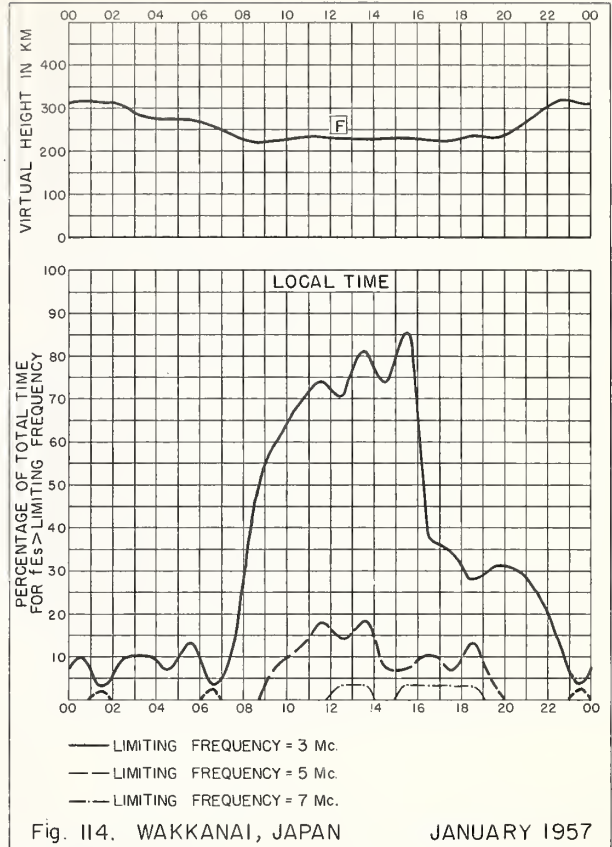
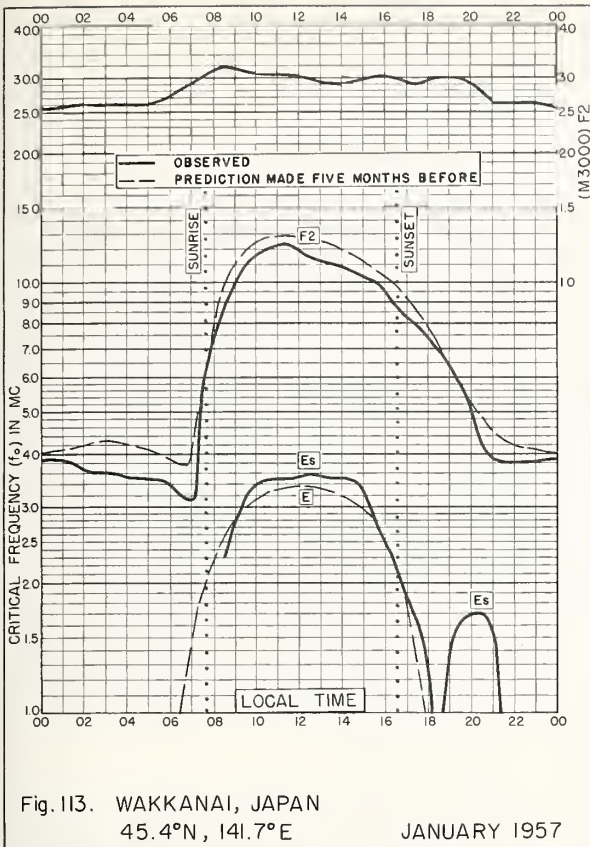


Fig. 112. ROSTOV-ON-DON, U.S.S.R.

JANUARY 1957

NBS 490





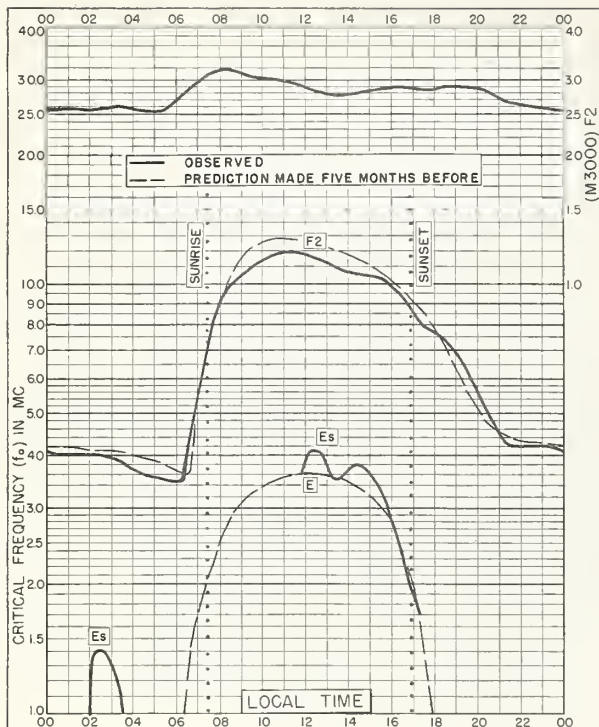


Fig. 117. AKITA, JAPAN  
39.7°N, 140.1°E

JANUARY 1957

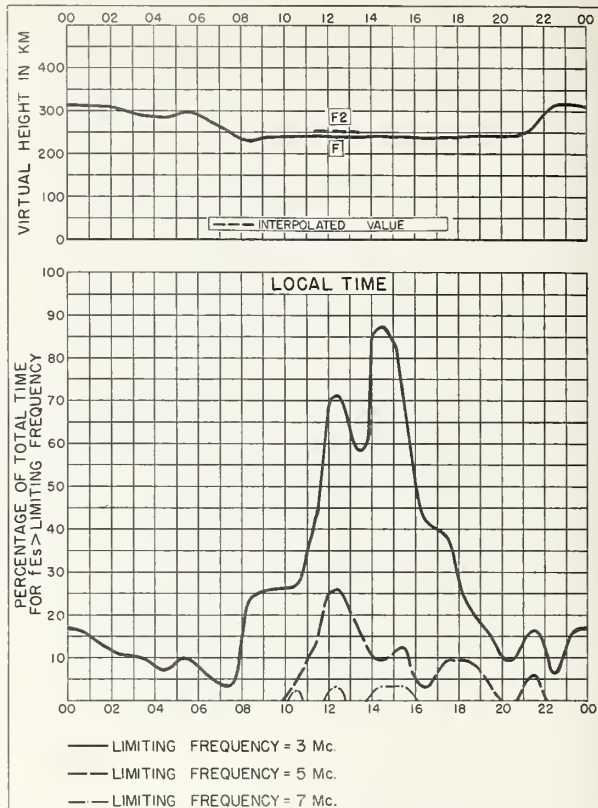


Fig. 118. AKITA, JAPAN

JANUARY 1957

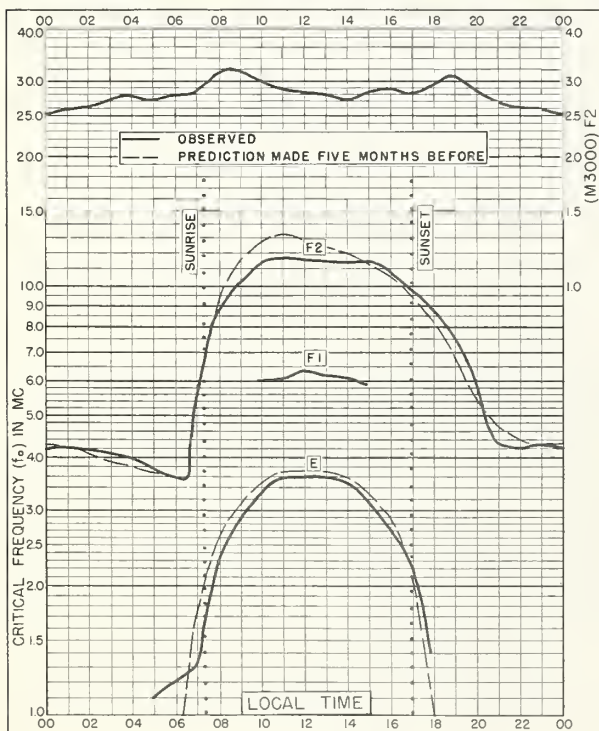


Fig. 119. ASHKHABAD, U.S.S.R.  
37.9°N, 58.3°E

JANUARY 1957

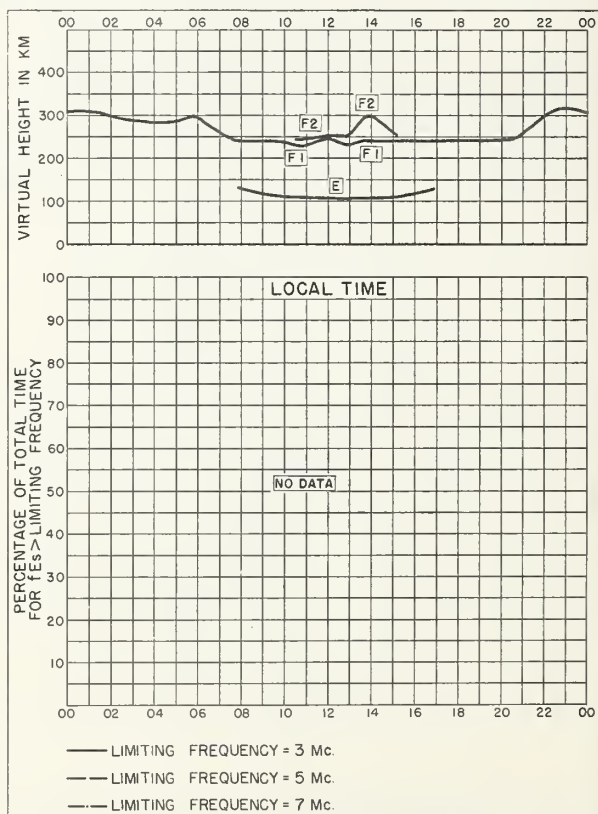


Fig. 120. ASHKHABAD, U.S.S.R.

JANUARY 1957



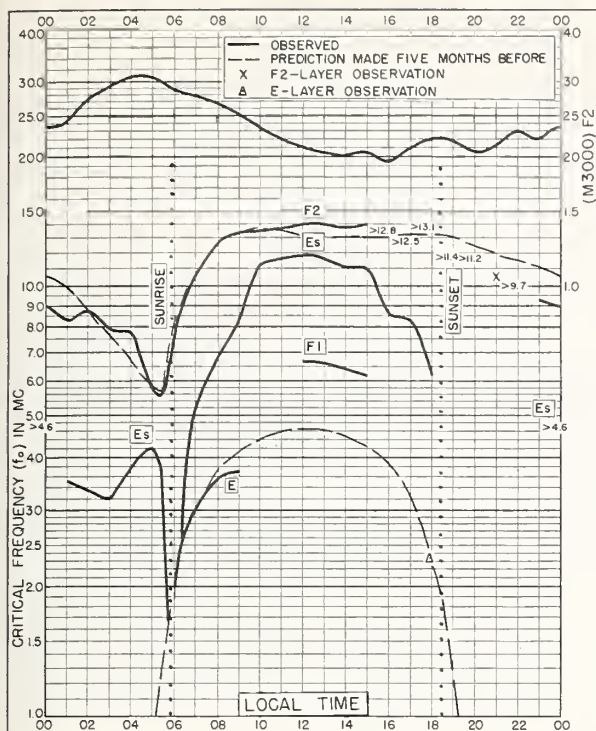


Fig. 121. HUANCAYO, PERU  
12.0°S, 75.3°W

JANUARY 1957

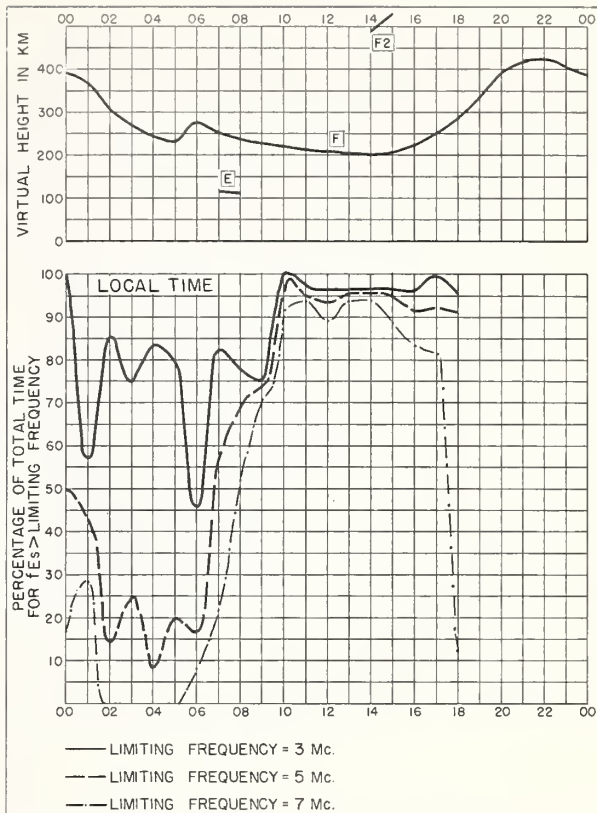


Fig. 122. HUANCAYO, PERU

JANUARY 1957

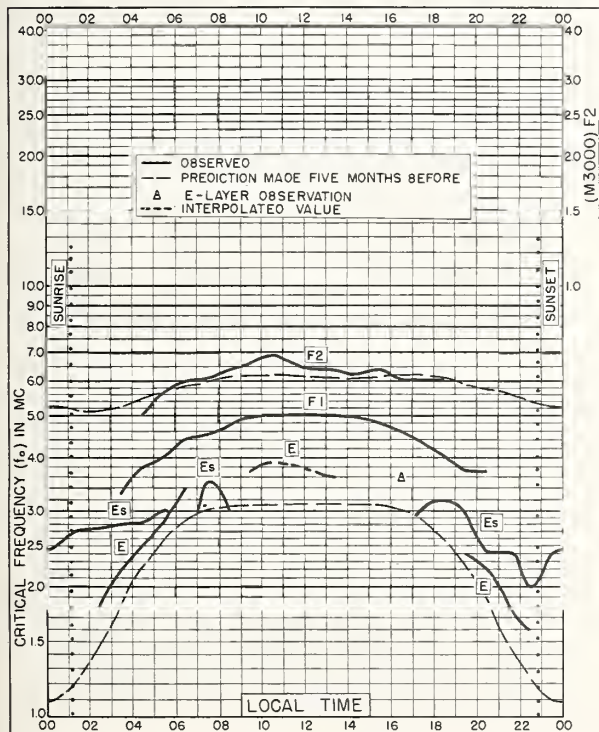


Fig. 123. LULEA, SWEDEN  
65.6°N, 22.1°E

JUNE 1956

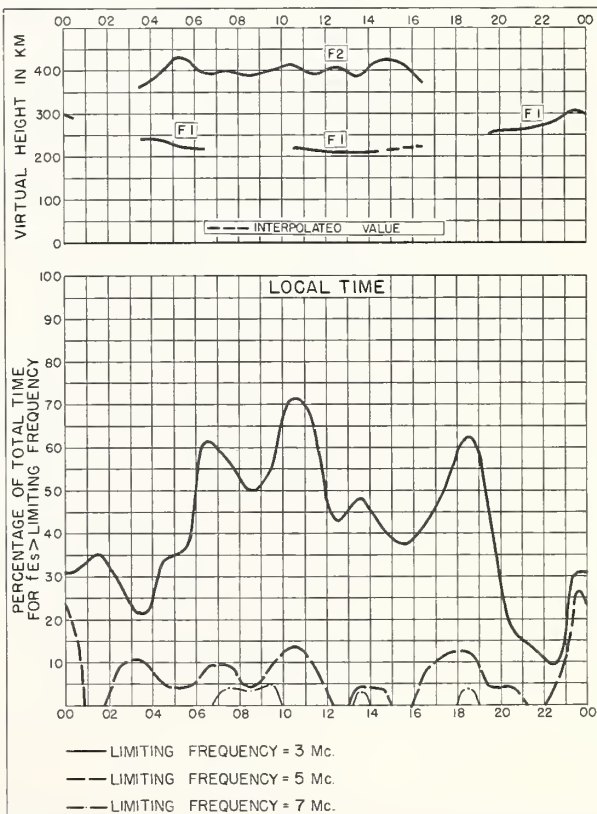


Fig. 124. LULEA, SWEDEN

JUNE 1956



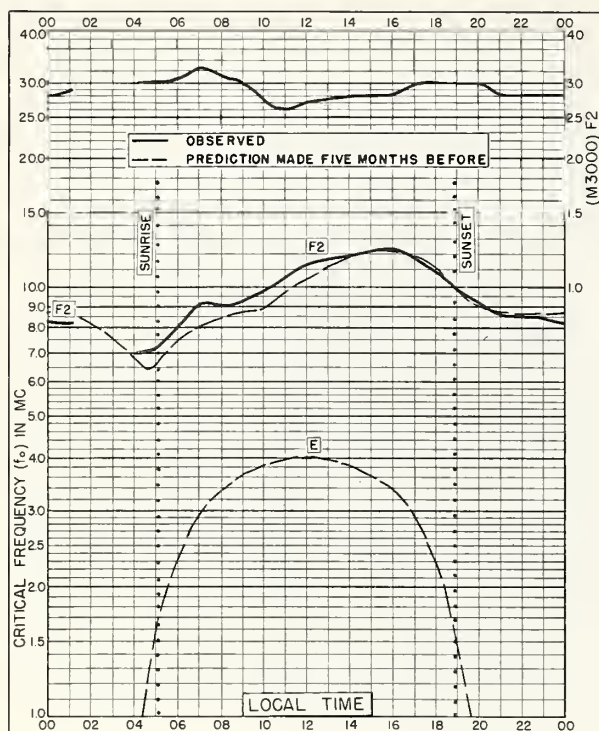


Fig. 125. DELHI, INDIA  
28.6°N, 77.1°E

JUNE 1956

NBS 503

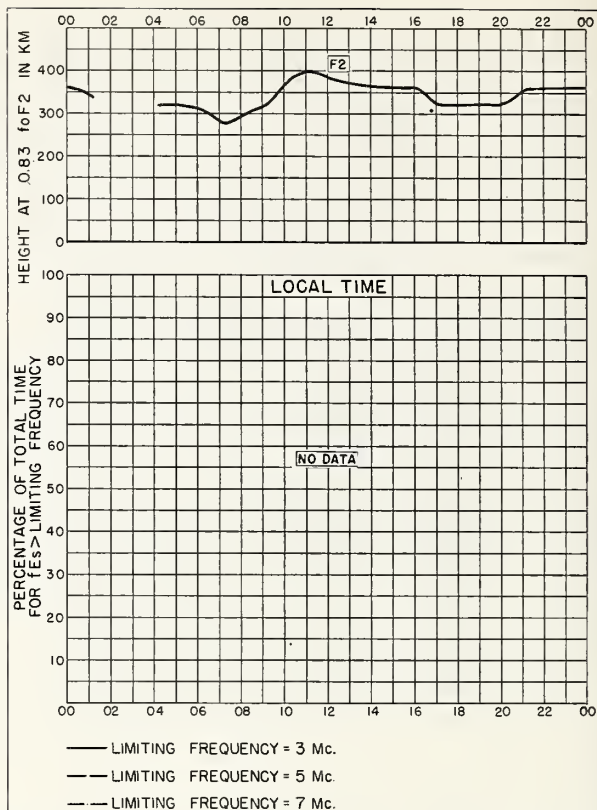


Fig. 126. DELHI, INDIA

JUNE 1956

NBS 490

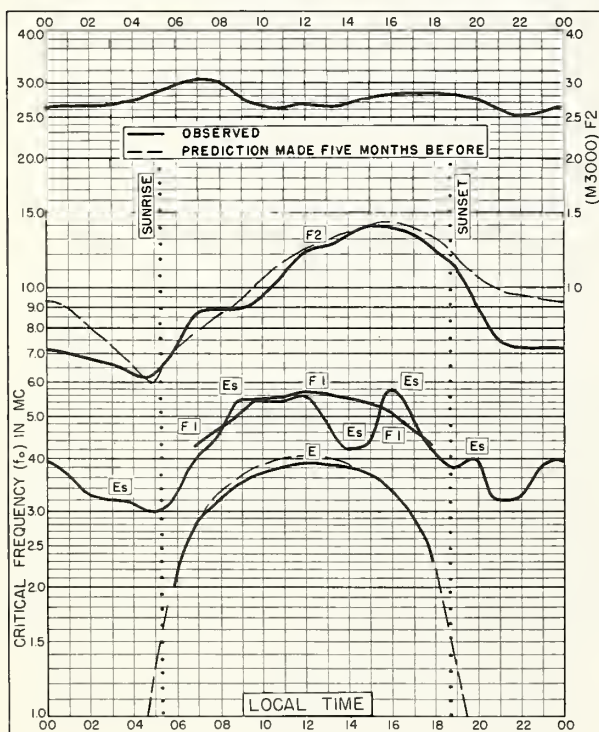


Fig. 127. AHMEDABAD, INDIA  
23.0°N, 72.6°E

JUNE 1956

NBS 503

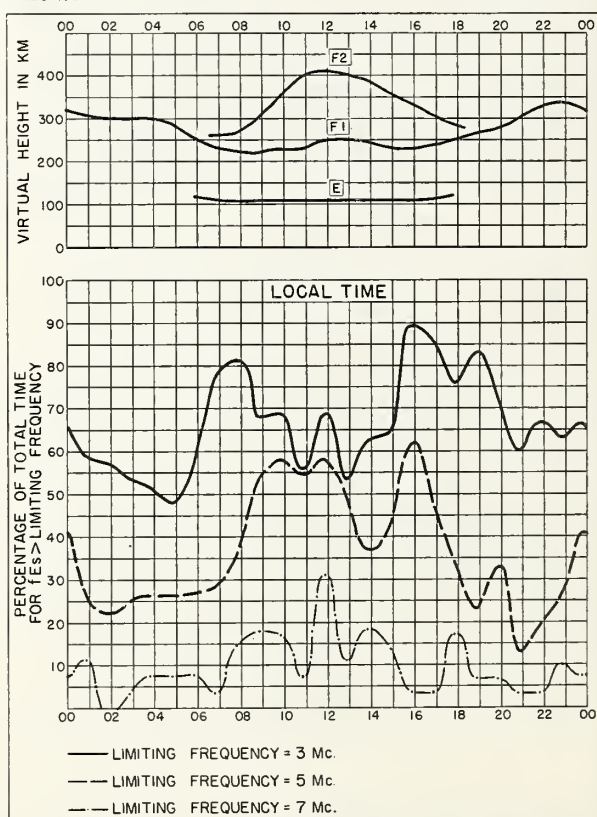


Fig. 128. AHMEDABAD, INDIA

JUNE 1956

NBS 490

N. A. UNIVERSITY PUBLICATION OFFICE 125077

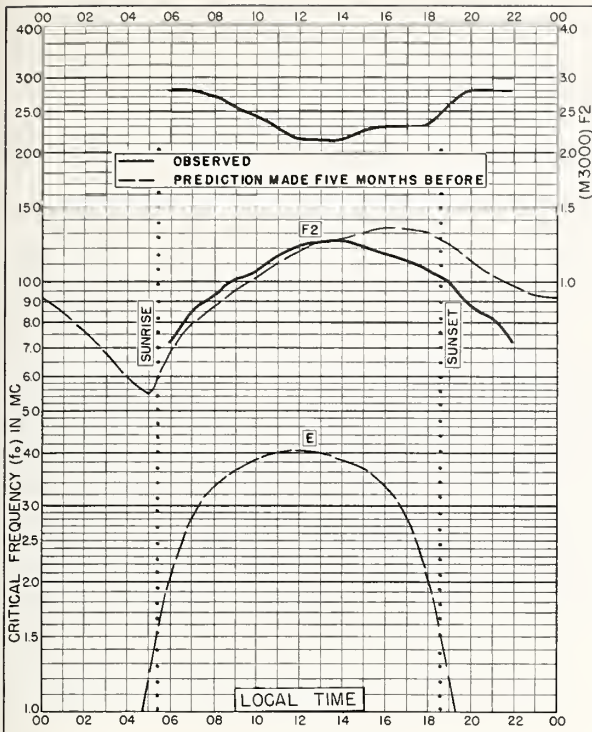


Fig. 129. BOMBAY, INDIA  
19.0°N, 73.0°E

JUNE 1956

NBS 505

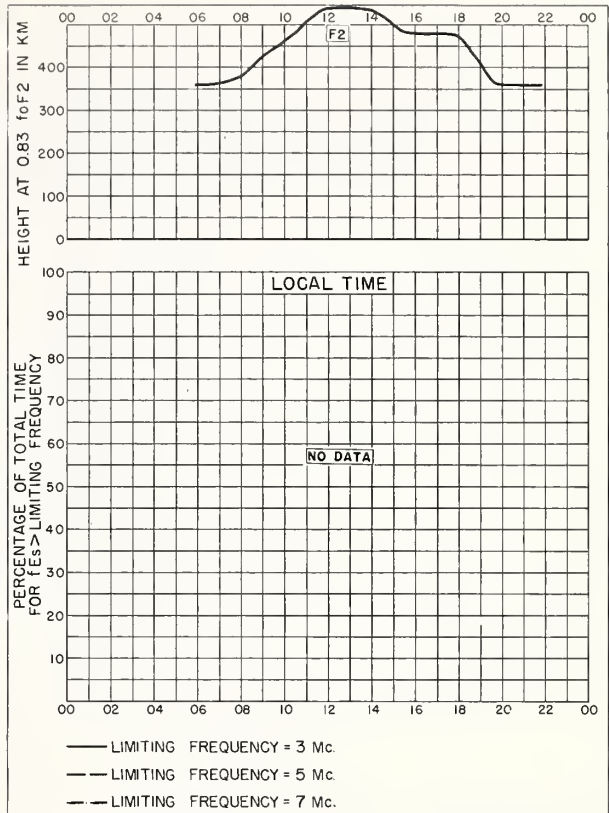


Fig. 130. BOMBAY, INDIA

JUNE 1956

NBS 490

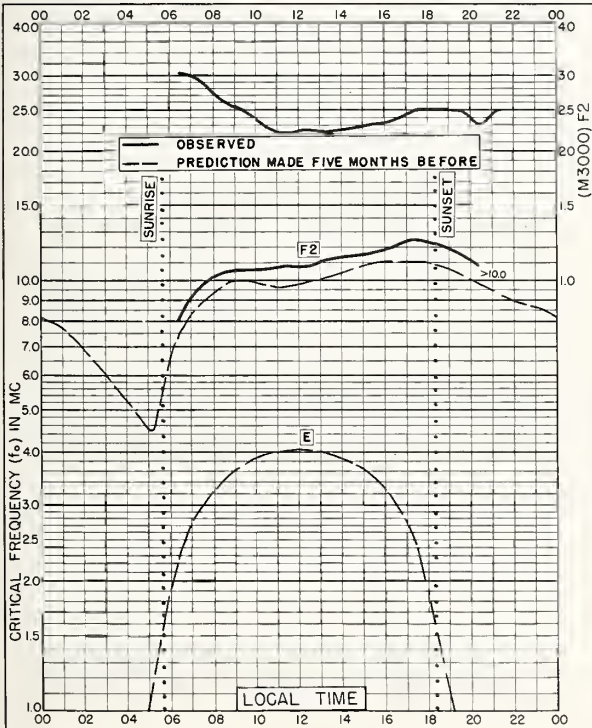


Fig. 131. MADRAS, INDIA  
13.0°N, 80.2°E

JUNE 1956

NBS 505

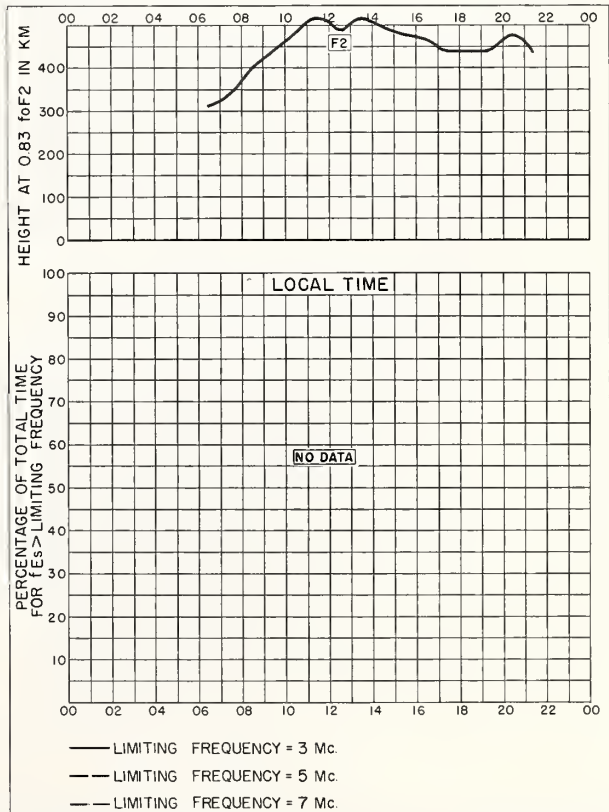


Fig. 132. MADRAS, INDIA

JUNE 1956

NBS 490

NBS 490



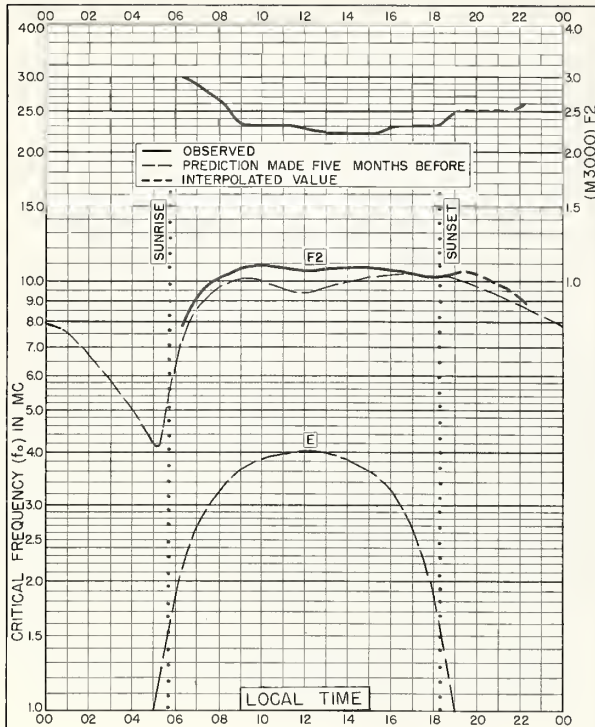


Fig. 133. TIRUCHY, INDIA  
10.8°N, 78.8°E

JUNE 1956

NBS 503

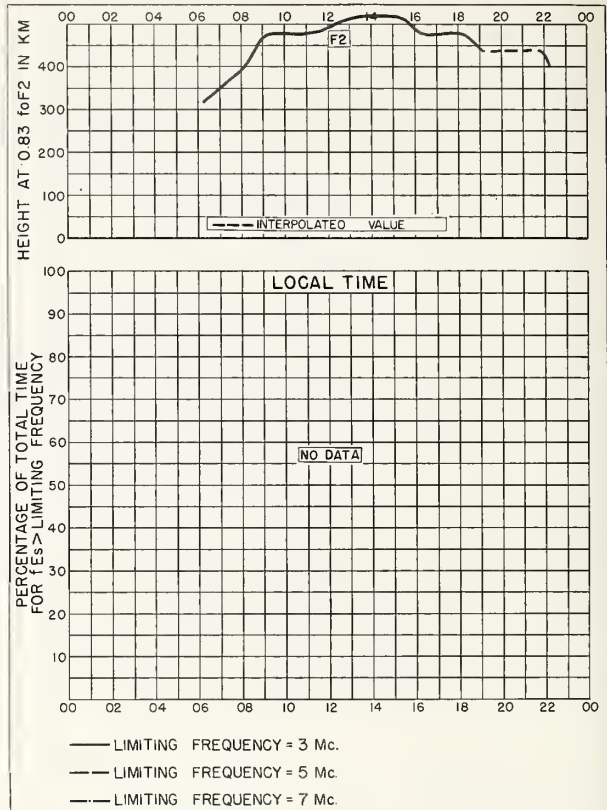


Fig. 134. TIRUCHY, INDIA

JUNE 1956

NBS 490

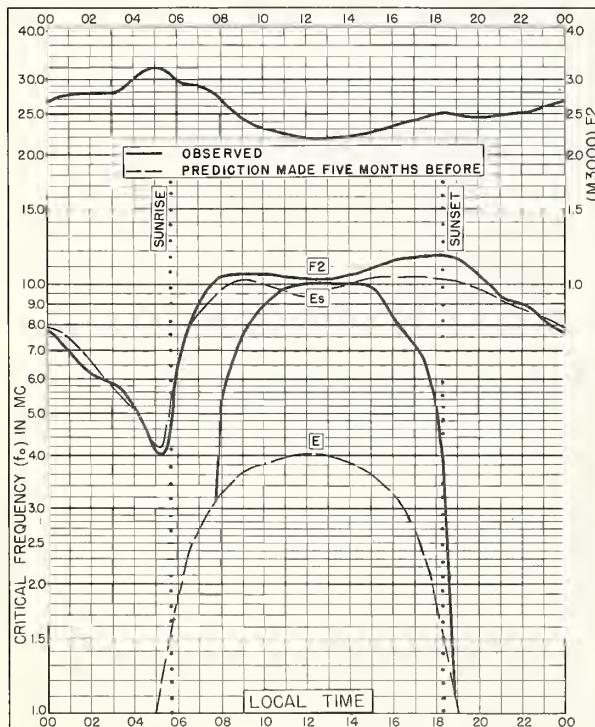


Fig. 135. KODAIKANAL, INDIA  
10.2°N, 77.5°E

JUNE 1956

NBS 503

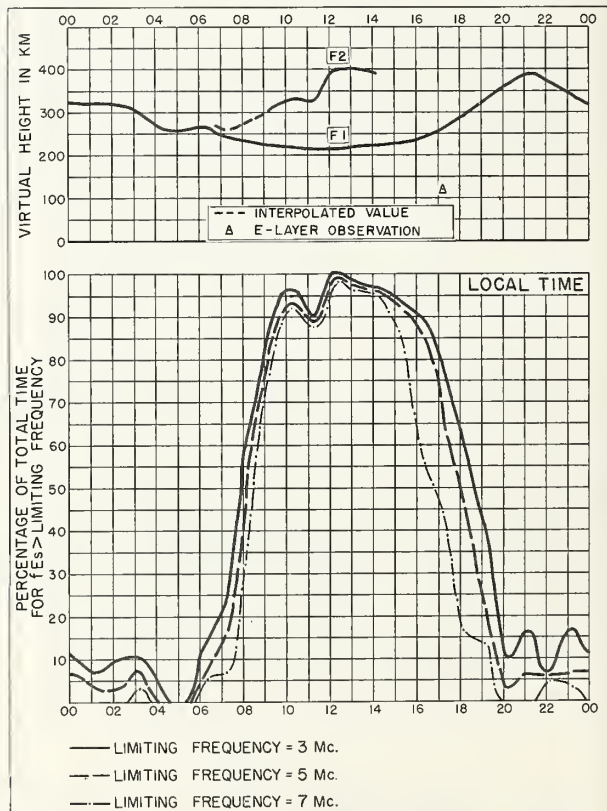


Fig. 136. KODAIKANAL, INDIA

JUNE 1956

NBS 490



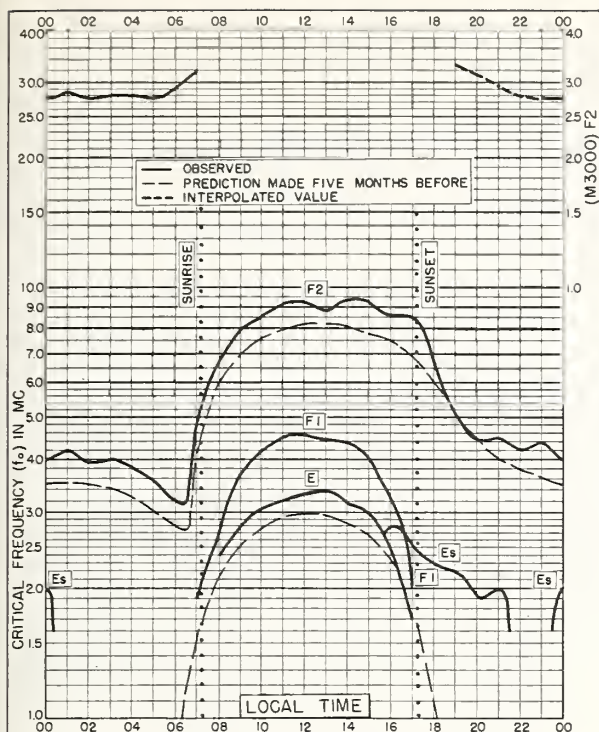


Fig. 137. POITIERS, FRANCE  
46.6°N, 0.3°E

FEBRUARY 1956

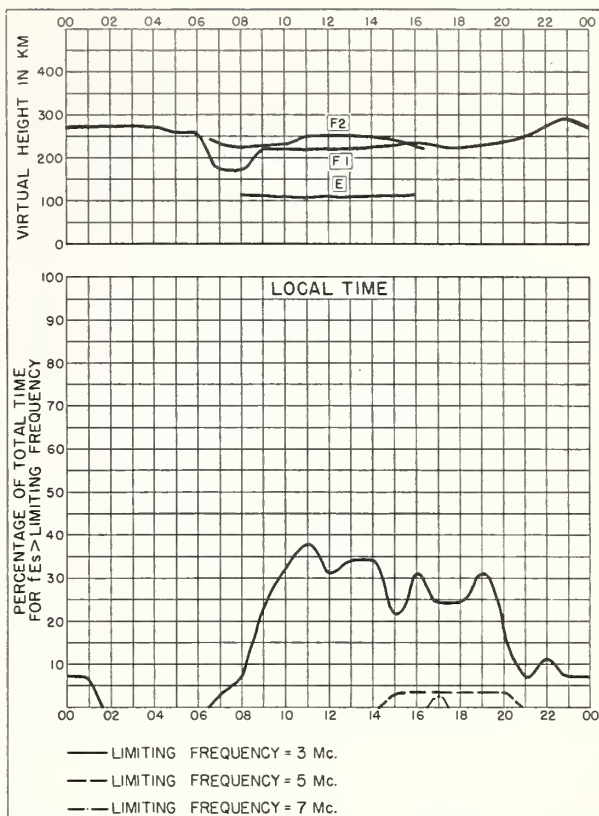


Fig. 138. POITIERS, FRANCE

FEBRUARY 1956

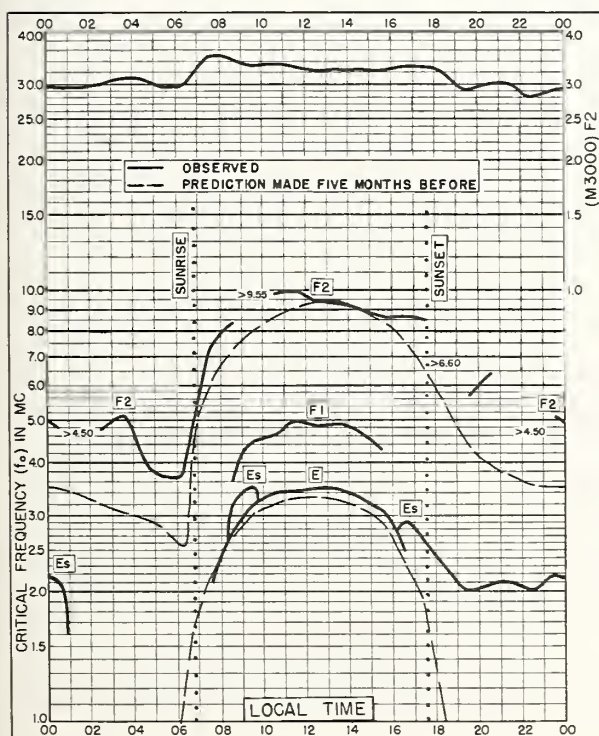


Fig. 139. CASABLANCA, MOROCCO  
33.6°N, 7.6°W

FEBRUARY 1956

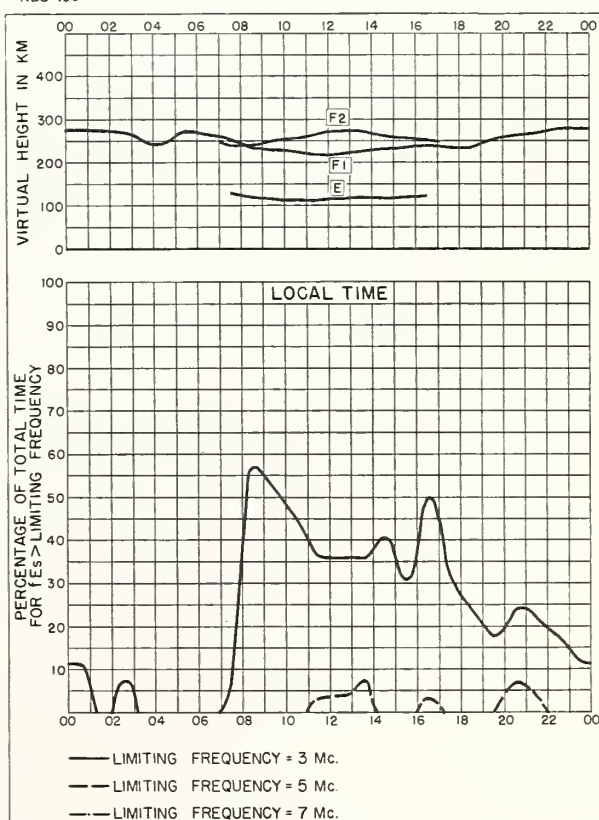


Fig. 140. CASABLANCA, MOROCCO

FEBRUARY 1956

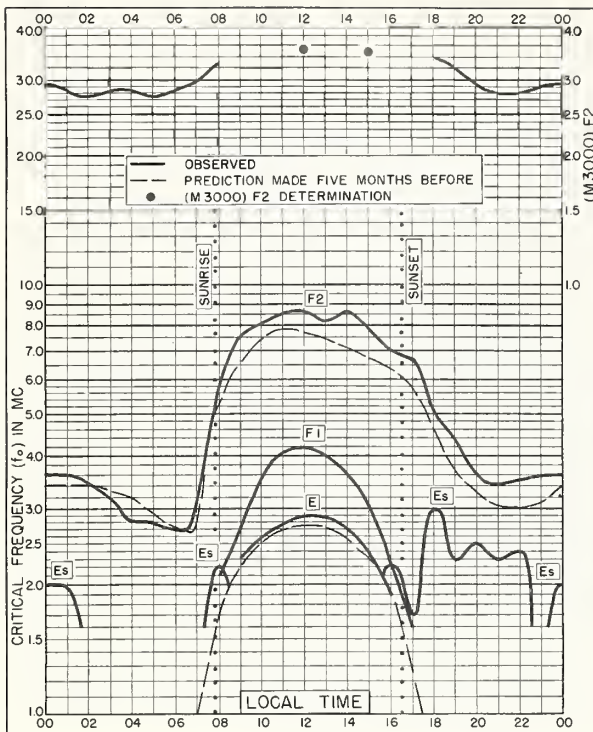


Fig. 141. POITIERS, FRANCE  
46.6°N, 0.3°E

JANUARY 1956

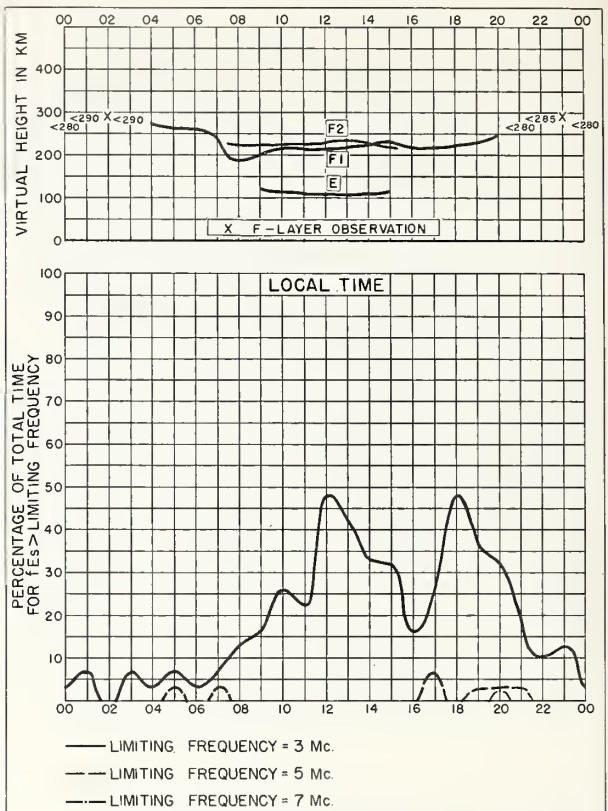


Fig. 142. POITIERS, FRANCE

JANUARY 1956

NBS 490

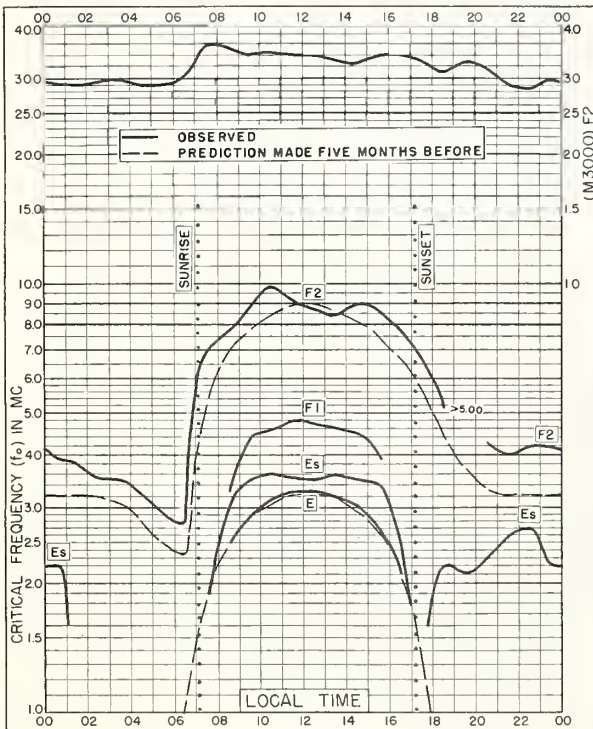


Fig. 143. CASABLANCA, MOROCCO  
33.6°N, 7.6°W

JANUARY 1956

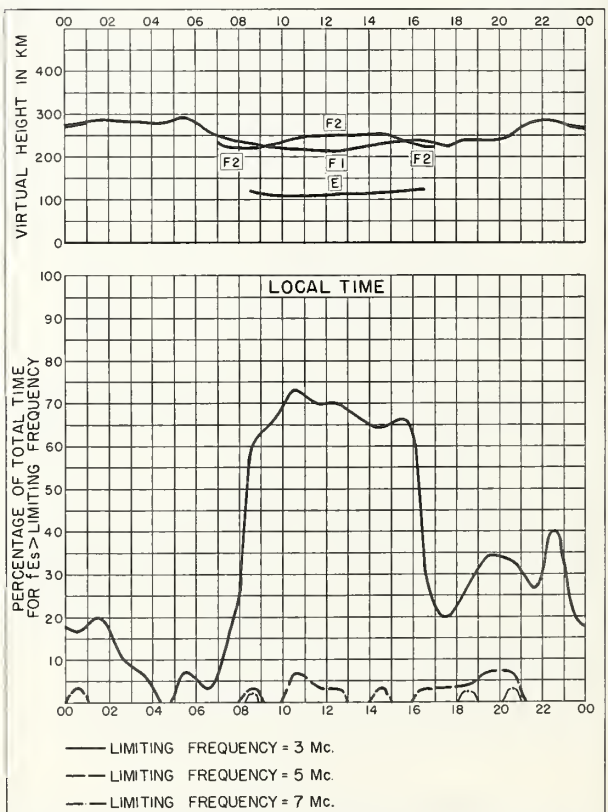


Fig. 144. CASABLANCA, MOROCCO

JANUARY 1956

NBS 490

Index of Tables and Graphs of Ionospheric Data  
in CRPL-F155 (Part A)

	<u>Table page</u>	<u>Figure page</u>
Adak, Alaska		
April 1957 . . . . .	20	46
March 1957 . . . . .	22	53
Ahmedabad, India		
June 1956. . . . .	29	74
Akita, Japan		
February 1957. . . . .	25	62
January 1957 . . . . .	28	72
Alma-Ata, U.S.S.R.		
January 1957 . . . . .	28	71
Anchorage, Alaska		
April 1957 . . . . .	20	46
March 1957 . . . . .	22	52
Ashkhabad, U.S.S.R.		
January 1957 . . . . .	28	72
Baguio, P. I.		
March 1957 . . . . .	23	55
February 1957. . . . .	26	64
Baker Lake, Canada		
February 1957. . . . .	23	57
Bombay, India		
June 1956. . . . .	29	75
Capetown, Union of S. Africa		
February 1957. . . . .	27	67
Casablanca, Morocco		
February 1956. . . . .	30	77
January 1956 . . . . .	30	78
Churchill, Canada		
February 1957. . . . .	24	59
De Bilt, Holland		
February 1957. . . . .	24	59
Delhi, India		
June 1956. . . . .	29	74
Fairbanks, Alaska		
March 1957 . . . . .	21	51
Formosa, China		
February 1957. . . . .	26	64
Ft. Monmouth, New Jersey		
April 1957 . . . . .	20	47
March 1957 . . . . .	22	54
Graz, Austria		
May 1957 . . . . .	19	44

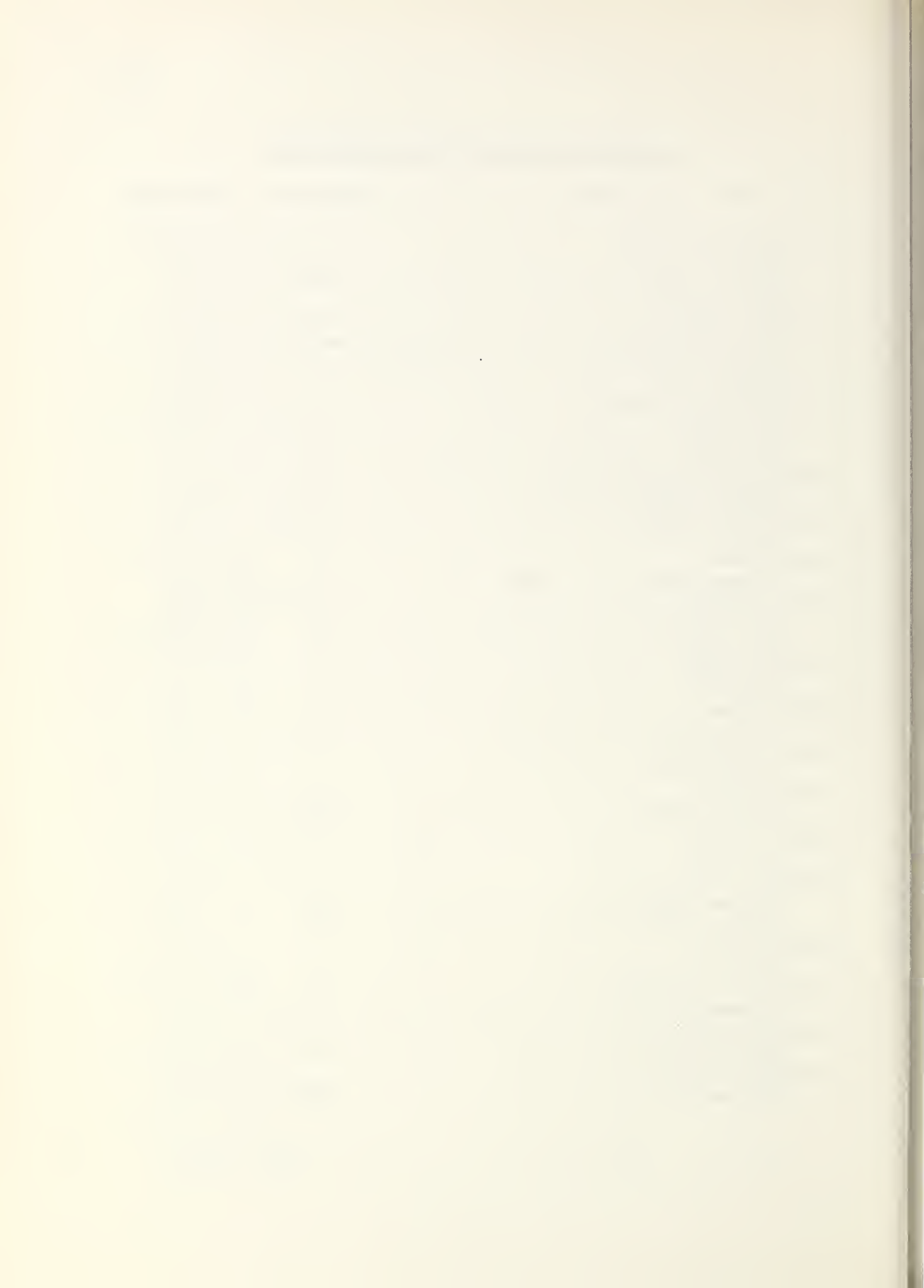


Index (CRPL-F155 (Part A), continued)

	<u>Table page</u>	<u>Figure page</u>
Ihuancayo, Peru		
February 1957. . . . .	26	66
January 1957 . . . . .	29	73
Irkutsk, U.S.S.R.		
January 1957 . . . . .	28	70
Johannesburg, Union of S. Africa		
February 1957. . . . .	26	66
Kiruna, Sweden		
February 1957. . . . .	23	56
Kodaikanal, India		
June 1956. . . . .	30	76
Leningrad, U.S.S.R.		
January 1957 . . . . .	27	68
Lindau/Harz, Germany		
February 1957. . . . .	24	60
Lulea, Sweden		
March 1957 . . . . .	21	50
February 1957. . . . .	23	57
June 1956. . . . .	29	73
Madras, India		
June 1956. . . . .	29	75
Maui, Hawaii		
April 1957 . . . . .	20	48
Moscow, U.S.S.R.		
January 1957 . . . . .	27	69
Nairobi, Kenya		
February 1957. . . . .	26	65
Narsarssuak, Greenland		
March 1957 . . . . .	22	52
Nurmijarvi, Finland		
February 1957. . . . .	24	58
Okinawa I.		
April 1957 . . . . .	20	48
Oslo, Norway		
May 1957 . . . . .	19	43
Ottawa, Canada		
March 1957 . . . . .	22	53
February 1957. . . . .	25	61
Panama Canal Zone		
April 1957 . . . . .	21	49
Point Barrow, Alaska		
April 1957 . . . . .	19	45
Poitiers, France		
February 1956. . . . .	30	77
January 1956 . . . . .	30	78

Index (CRPL-F155 (Part A), concluded)

	<u>Table page</u>	<u>Figure page</u>
Resolute Bay, Canada		
March 1957 . . . . .	21	50
February 1957. . . . .	23	55
Reykjavik, Iceland		
March 1957 . . . . .	21	51
February 1957. . . . .	24	58
Rostov-on-Don, U.S.S.R.		
January 1957 . . . . .	28	70
San Francisco, California		
April 1957 . . . . .	20	47
March 1957 . . . . .	22	54
Schwarzenburg, Switzerland		
February 1957. . . . .	25	61
Sverdlovsk, U.S.S.R.		
January 1957 . . . . .	27	68
Talara, Peru		
February 1957. . . . .	26	65
Thule, Greenland		
April 1957 . . . . .	19	45
March 1957 . . . . .	21	49
Tiruchy, India		
June 1956 . . . . .	30	76
Tokyo, Japan		
February 1957. . . . .	25	63
Tomsk, U.S.S.R.		
January 1957 . . . . .	27	69
Tromso, Norway		
February 1957. . . . .	23	56
Upsala, Sweden		
May 1957 . . . . .	19	44
Wakkanai, Japan		
February 1957. . . . .	25	62
January 1957 . . . . .	28	71
Washington, D. C.		
June 1957. . . . .	19	43
Watheroo, W. Australia		
February 1957. . . . .	27	67
Winnipeg, Canada		
February 1957. . . . .	24	60
Yamagawa, Japan		
February 1957. . . . .	25	63





---

## CRPL Reports

[A detailed list of CRPL publications is available from the Central Radio Propagation Laboratory upon request]

*Daily:*

Radio disturbance forecasts, every half hour from broadcast stations WWV and WWVH of the National Bureau of Standards.

Telephoned and telegraphed reports of ionospheric, solar, geomagnetic, and radio propagation data.

*Semiweekly:*

CRPL—J. North Atlantic Radio Propagation Forecast (of days most likely to be disturbed during following month).

CRPL—Jp. North Pacific Radio Propagation Forecast (of days most likely to be disturbed during following month).

*Semimonthly:*

CRPL—Ja. Semimonthly Frequency Revision Factors For CRPL Basic Radio Propagation Prediction Reports.

*Monthly:*

CRPL—D. Basic Radio Propagation Predictions—Three months in advance. (Dept. of the Army, TB 11-499, monthly supplements to TM 11-499; Dept. of the Air Force, TO 31-3-28 series). On sale by Superintendent of Documents.\* Members of the Armed Forces should address cognizant military office.

CRPL—F. (Part A). Ionospheric Data.

(Part B). Solar-Geophysical Data.

Limited distribution. These publications are in general disseminated only to those individuals or scientific organizations which collaborate in the exchange of ionospheric, solar, geomagnetic or other radio propagation data or in exchange for copies of publications on radio, physics, and geophysics for the CRPL library.

The publications listed above may be obtained without charge from the Central Radio Propagation Laboratory, National Bureau of Standards, Boulder Laboratories, Boulder, Colorado, unless otherwise indicated. Please note that the F series is not generally available.

---

*Circulars of the National Bureau of Standards pertaining to Radio Sky Wave Transmission:*

NBS Circular 462. Ionospheric Radio Propagation. \$1.25.

NBS Circular 465. Instructions for the Use of Basic Radio Propagation Predictions. 30 cents.

NBS Circular 557. Worldwide Radio Noise Levels Expected in the Frequency Band 10 Kilocycles to 100 Megacycles. 30 cents.

These Circulars are on sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Members of the Armed Forces should address the respective military office having cognizance of radio wave propagation.

---

\* For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C. Price 10 cents (single copy). Subscription Price: \$1.00 a year; 25 cents additional for foreign mailing.

